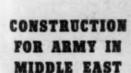
A PICTORIAL SURVEY OF CURRENT PRACTICE, EQUIPMENT AND MATERIALS

# Construction Methods

Wednam. BILL PERLITRING COMPARY, INC. . PRICE 28 CENTS

OCTOBER 1943



ow an American contracr, working under tough opical conditions in forgn lands, provided facilies for Allied fighting rces—as told by ROBERT BAYARD, General Manaer for Johnson, Drake & per, Inc., to ROBERT K. OMLIN, Editor of Connuction Methods.



GREETED BY NATIVES after trip overseas. ROBERT P. BAYARD arrives in Africa to direct construction projects.



# OF STEEL PRODUCTION

INLAND STEEL CO.

1893

INLAND STEEL CO.

1943

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#### CURRENT JOBS

.... and Who's Doing Them

#### BUILDINGS .

Public-Defense Plant Corp. contract for \$18,000,000 aluminum plant at Raines Station, Tenn., went to Struck Construction Co., of Louisville, Ky. Jas. Stewart & Co., of New York, will build manufacturing plant in Maryland for an estimated \$6,000,000. Contract for \$2,510,000 dwelling units in Alameda, Calif., was awarded to Stolte. Inc., of Alameda. Navy contract for buildings in New Jersey went to Cauldwell-Wingate Co., of New York, for \$2,500,000-\$3,000,000. Stone & Webster Engineering Corp., of Boston, Mass., and Bay-town, Tex., will build gasoline refinery plant in Texas for \$2,000,000. Navy contract for housing in Bainbridge, Md., went to John McShain, Inc., of Philadelphia, Pa., for \$1,987,000. **Tobias Heller & Co., Inc.,** of New York, has \$1,827,000 contract for dwelling units in Pennsylvania. Dwelling units will built in California by L. Epp. of San Francisco, for \$1,696,361. G. A. Bell Engineering Co., of Los Angeles, Calif., was awarded \$1,060,889 Navy contract for warehouse building at Terminal Island. Family housing in South Carolina will be constructed by **H. C. Beck**, of Atlanta, Ga., for \$1,012,700. **Paschen Bros.**, of Chicago, Ill., has \$1,000,000 Army contract for building in Illinois. Another \$1,000,000 Army contract for buildings in Nebraska was awarded to **Standard Construction Co.. Inc.**, of Minneapolis, Minn. Industrial-Detinning plant in Alabama will be built by **H. K. Ferguson Co.**, of Cleveland, Ohio, for an estimated \$2,000,000. **Brown Construction Co..** of Cleveland, Ohio, box contract for \$2,000,000. foreton, at Marshillon.

Cleveland, Ohio, has contract for \$2,000,000 factory at Massillon. Commercial-Contract for 456 homes in Texas City, Tex., was awarded to

Herman Lloyd, of Houston, for \$2,052,000.

#### HEAVY CONSTRUCTION

Army contract for improvements in Namao, Alta., was awarded to Coast Construction Co., Ltd., of Vancouver, B. C., \$4,500,000. Woodworth & Co., Inc., and MacDonald Building Co., of Tacoma, Wash., have \$2,000,000 Army contract for construction at military installation. George A. Fuller Co., of New York, will build \$2,000,000 improvements at aircraft plant in Ohio. Concrete arch dam at National City, Calif., will be built for \$1,114,890 by Macco Construction Co., of Sweetwater. Army contract for \$1,000,000 construction of military installation in Washington was awarded to Sound Construction, Ford J. Twaits, and Morrison-Knudsen Co., Inc., of Seattle. Another \$1,000,000 Army contract for construction in Ohio went to Herman Holmes, of Crystal Falls, Mich. Poirier & McLane Corp., of New York, will build improvements at Army Air Forces installation in New York for more than

#### HIGHWAYS AND BRIDGES

Among recent highway contract awards are the following: Arizona: \$600,-000-\$700,000 to Basich Bros., of Alhambra. California: \$641,894 to J. A. Casson & N. M. Ball & Sons, of Berkeley: and \$521,901 to Radich & Brown, of San Leandro. Michigan: \$315,472 to L. A. Davidson, of Lansing, New of San Leandro. Michigan: \$315,472 to L. A. Davidson, of Lansing, New Mexico: \$367,732 to Lowdermilk Bros., of Denver, Colo, Nevada: \$246,000 to Gibbons & Reed and J. C. Compton, of Hawthorne; \$233,135 to Silver State Construction Co., of Fallon; and \$345,810 to Nevada Rock & Sand Co., Inc., of Reno. New Jersey: \$400,000 to Union Paving Co., of Philadelphia, Pa. New York: \$244,000 to H. E. Millis Contracting Corp., of Amenia, Oklahoma: \$241,651 to J. H. Thomson, of Oklahoma City. Oregon: \$348,823 to Morrison-Knudsen Co., of Boise, Idaho. South Carolina: \$266,813 to Fred N. Thompson, of Charlotte, N. C. Texas: \$742,000 to Texas Bitalithic Co., of Dallas; \$231,000 to Texas Bitalithic Co., of Dallas; \$321,000 to Texas Bitalithic Co., of Dallas; \$321,000 to Texas Bitalithic Co. 000 to Vilbig Construction Co., of Dallas: and \$290,262 to Cage Bros. & H. E. Williams, of Bishop. Washington: \$200,000 to Woodworth & Co., Inc., and Williams, of Bishop. Washington: MacDonald Building Co., of Moses.

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Patricia McGerr

OCTOBER, 1943

For the benefit of readers concerned with the practical application of method or equipment the following references are to articles or illustrations in this issue that tell:

How GLUED PLASTERBOARD reduced number of nails required in constructing dormitories for Kaiser shippard workers.

—p. 49

How BOMBER BASE CONSTRUCTION was speeded in England with aid of CONSTRUCTION FOR ALLIED ARMIES in Middle East was accomplished by American contractors' organization.

How FLOATING DRYDOCK, scuttled by Italians, was salvaged. How NATIVE LABOR was employed for construction operations in Africa. How BEACH UMBRELLAS protected welders on steel ship construction from How POWER EQUIPMENT was used in building railroad track and roads on How TRUCK SHUTTLE SERVICE speeded cableway handling concrete for SIGNALMAN equipped with pushbutton and telephone controlled condam monoliths. How PORTABLE PIPELINE carries water and liquid fuels behind battle How GIN POLE AND CRAWLER CRANE worked together to raise tall 35 BRITAIN'S ROYAL ENGINEERS built 145-mi. water pipeline across Afri-TIME-SAVING METHODS AND EQUIPMENT speeded huge mass hous-How JOB-MADE ESCALATOR carried lumber to second floor and roof of apartments under construction. —p. 70
How PORTABLE FRAMES supported planks on which workmen finished How CHAIN-DRIVE BRACES speeded hole boring for electric wiring in LOCAL CONTRACTORS' ORGANIZATIONS have helped New York to develop shelf of essential public works projects. —p. 74
How FLOOD FIGHTING by employees protected plants of equipment com-How GASOLINE DRUMS were used by Seabees in making roofs, pipelines

#### 🚃 McGRAW-HILL PUBLISHING COMPANY, INC., 330 WEST 42d STREET, NEW YORK (18), N. Y. 📖

JAMES H. McGRAW. Founder and Honorary Chairman

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McGRAW-HILL PUBLISHING COMPANY 330 West 42nd Street, New York (18), N. Y.

Director of Circulation:

Please change my address on Construction Methods

Signed .

#### Free Enterprise

#### We Must Act to Preserve It!

Like a leaf floating downstream, we are being carried along toward a new and uncharted economy. What this new economy will be like will depend, to no small extent, upon what industry does or fails to do during the coming months. Time is short; in fact, we may suddenly find ourselves standing on the threshold of a peace economy with our war boots still on our feet.

While bending every effort to win the war, we cannot afford to be caught unprepared for the peace. As Prime Minister Churchill said at Harvard, we are "bound, so far as life and strength allow and without prejudice to our dominating military task, to look ahead to those days which will surely come, when we shall have finally beaten down Satan under our feet and find ourselves with other great Allies at once the masters and the servants of the future." Unless we do look ahead, there is danger that we may become neither the masters nor the servants, but merely the victims, of the future.

The war has quickened our ailing economy and opened our eyes again to the possibilities of peacetime plenty. But it has also brought great dislocations of labor and capital; it has led to abnormal patterns in prices and income distribution; and it has created inflationary pressures with enormous potential powers to injure or to help us in the transition from war to peace.

The pattern of life in postwar America will be just what we make it. All of us will have a hand in shaping that pattern, but businessmen will have a special responsibility in the reconstruction. As employers of labor and capital and as enterprisers assuming the risks of new ventures, they will have to plan and carry out the conversion from war work to full peace-time production. Because of their key role, businessmen have a special opportunity to discover, and to help others to understand, the conditions which are necessary if they are to do their job satisfactorily.

This is a narrow view of postwar problems but it is a central view, because no one condition is more vital to the health of the world than a high level of production and employment in the United States. We cannot hope to lead the world out of economic chaos if we fail to put our own house in order. If we fail to adjust our domestic economy. we may destroy Adolf Hitler; but we will not destroy the germ that breeds "Hitlers." If we do not maintain the production necessary for supporting a large volume of imports and exports, then the plans for international monetary stabilization, for good relations with our neighbors, for rehabilitation of stricken countries, and for strengthening the democratic bulwarks against dictatorship are all likely to come to grief. We must demonstrate our capacity for world leadership, or be content to follow the leadership of others.

The prospects for achieving a sound and vigorous economy in the United States are not so good as to warrant complacency on the part of men genuinely interested in free enterprise and the political freedoms incident to it. We have yet to find means to utilize our vast and abundant resources for the good of all. We have yet to learn how to keep men from the terrible experience of unemployment and the fear of want which makes them willing to sacrifice freedom and opportunity for almost any promise of security. We have yet to reconcile the conflicting interests of labor, agriculture, and business so that they can work together effectively. We have yet to learn how to check the fever of inflation and cure the palsy of depression.

When we were attacked at Pearl Harbor, we realized our physical peril immediately and united in a tremendous common effort against the enemy. The onset of economic perils is less obvious. No bombs will signal the deterioration of the private enterprise system, the extension of regimentation, the further control of business by government, and the concentration of political power in less and less responsible hands. If these things should befall us, they will come insidiously while we are preoccupied with self-interests and oriented by popular misconceptions. If the freedoms of the individual shrivel as the state grows in power, it will be because the individual is too indifferent or complacent to concern himself seriously with economic problems. If our people are misled by false prophets and demagogues, it will be because business men did not understand economics, because scholars were too ignorant of practical affairs, and because we failed to produce economic statesmen of sufficient stature for the task in hand.

Thinking is hard work. Thinking about things outside our personal experience, ibout economic processes that are broader and in some fundamental respects different from buying and selling or running a business-is strenuous mental labor. Thinking straight about problems that are beyond our personal and immediate status and our pocketbooks, thinking about problems that involve nation-wide production, nation-wide employment and nationwide buying power-in other words the operation of our entire economic system-involves real selfdiscipline. Yet there is no other way to safeguard our freedoms. We cannot rely on trial and error; tinkering takes too long; social experiments which turn out wrong can be undone only at great costif at all. If we proceed blindly, we shall flounder into an economic and political morass from which we cannot escape.

We floundered badly all through the Thirties, until the war lifted us temporarily to higher ground. When the war boom is over, we shall be back floundering worse than ever unless we find a solid road along which to proceed.

America has grown rich and strong under a system of political and economic freedom. Opportunity and the necessity of self-reliance have brought forth great accomplishments. The hope of profit and the spur of competition have urged men on to find new and better products, new and better methods, and to risk their savings in pioneer investment. Never has a country achieved so high a standard of living and afforded so large an opportunity for the individual man and woman. It is not surprising that some distinguished business leaders, looking

back over their own experience, tell us that everthing will be all right if only there is "less goernment in business."

I wish the solution were as simple as that. How ever this is only part of the answer. It is becoming increasingly clear that industrial capitalism as we know it contains within itself certain fundamental weaknesses which can lead to its destruction if they are not counteracted. No democracy can survive when twenty to thirty per cent of its workers cannot get jobs. That happened here in the Thirties. For years on end despite fumbling efforts at recovery one out of every five workers was denied a chance to earn a living in private business. We shall never again have such mass unemployment as occurred in the bottom of the Depression, because the government will take it upon itself to create jobs if business cannot offer them. Whenever that happens, however, the area of private enterprise will be reduced and that of government will be expanded—and the concentration of political power will be increased. This is the challenge we busis ness men face today, and ours is the first opportunity at finding the solution.

The crux of our economic problem is unemployment. Unless there are jobs for ninety to ninety-five per cent of those who are able and willing to work, there will be widespread fear and lack of opportunity, which will drive labor unions, agricultural groups, and business interests to take self-protective measures. Such measures are certain to restrict production, stifle progress, and imperil our democratic way of life. Not all our problems will automatically be solved if we learn how to avoid mass unemployment, but they will at least then have a good chance of solution.

And so American businessmen face a great responsibility! We will have to find the answer to a great many momentous questions. We will have to delve into problems that cannot be solved by precedent.

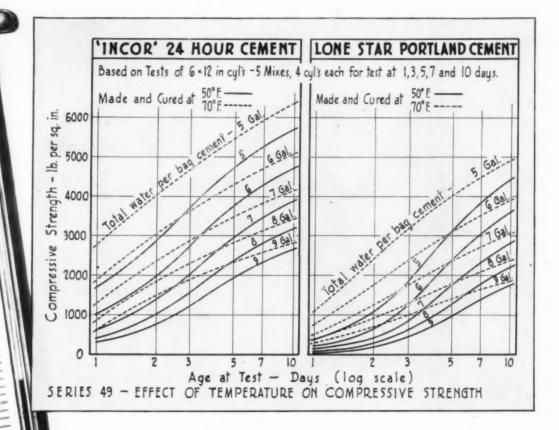
Looking backward to these times, future historians are likely to say that here we Americans stood at the crossroads and, consciously or not, made our choice between a system of private enterprise and personal freedom and a system of collectivism and regimentation.

It is particularly appropriate, therefore, as the problems of our time take shape and as events rearrange their order and importance, to appraise the steps we are taking and point the way we are going. It is my plan to present such analyses from time to time to the one-and-a-half million readers of McGraw-Hill publications.

Sames H. W. haw. N.

President, McGraw-Hill Publishing Company, 100

#### 'INCOR' KEEPS FALL JOBS ON SCHEDULE



Warm, sunny days of early Fall give no hint of near-freezing midnights. This is the in-between season, before you are set for Winter protection. Keep a weather-eye on the thermometer... when temperatures average around 50°, the hardening of concrete is retarded. Stripping schedules are delayed... jobs slow down to a walk. This is the time when 'Incor' 24-Hour Cement pays big extra profits. Without protection, 'Incor' concrete at 50° attains stripping strengths, is safe from sudden freeze, in one-third the usual time... job progress is maintained, costs are reduced... 'Incor'\* saves time, money, worry.

Continuous research in Lone Star Research Laboratories assures quality cements to meet the needs of today and tomorrow . . . and makes available a wide range of performance data, which is yours for the asking.

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Use 'Incor'. . . Save Time, Money, Worry!

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BEING FREE OF TENDENCIES

BEING NO SELECTION

1 LASTING LONGER 2 BEING SAFER TO HANDLE 3 SPOOLING BETTER 4 RESISTING BENDING FATIGUE LONGER

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- & REQUIRING NO SEIZING WHEN CUT 9 BEING FASTER TO INSTALL 10 GIVING YOU GREATER DOLLAR VALUE

In Hazard LAY-SET Preformed wire rope there are no interna cause the rope on a drum to climb over or roll away frg wrap of rope. The resistance that LAY-SET has to whipping als to good spooling. LAY-SET spools uniformly even under light high speed. This increases its life by avoiding the nicking, scarfing crushing that take such a severe toll of many wire ropes on the drum. Specify Hazard LAY-SET Preformed for all its built-in advantages.

HAZARD WIRE ROPE DIVISION Wilkes-Barre, Pa., Atlanta, Chicago, Denver, Fort Worth, Los Angeles, New York, Philadelphia, Pittsburgh, San Francisco, Tacoma AMERICAN CHAIN & CABLE COMPANY, Inc., BRIDGEPORT, CONNECTICUT



HAZARD LAY-SET

# Good Haul Roads



REDUCE COST PER TON

Rear-Dump and Bottom-Dump EUCLIDS are built to move big loads on difficult off - the - highway hauls, even under the most adverse conditions — that's one of the reasons you'll find them on the toughest jobs in mines, quarries and all types of construction work where heavy excavation must be hauled.

Whether you're using EUCLIDS or other rubbertired hauling equipment, good haul roads will help to substantially reduce your cost per ton hauled. On good roads, equipment can make more round trips per shift because it operates with greater speed and efficiency. Removal of rocks and sharp stones, filling of holes, and maintaining a good surface prolongs the service life of tires and equipment, and reduces mechanical failures due to strain and abuse to an operating minimum.

These days when new equipment and repair parts are so difficult to obtain, you will find it more profitable than ever to give your haul roads special care and attention.

The EUCLID ROAD MACHINERY Co. - - Cleveland, Ohio

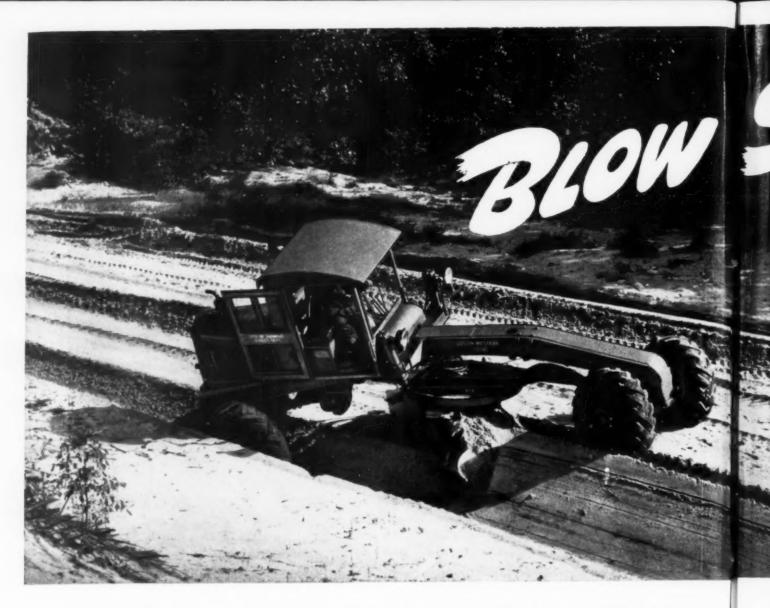




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SELF - POWERED
HAULING EQUIPMENT
FOR EARTH .. ROCK .. COAL .. ORE
CRAWLER WAGONS . ROTARY SCRAPERS . TAMPING ROLLERS

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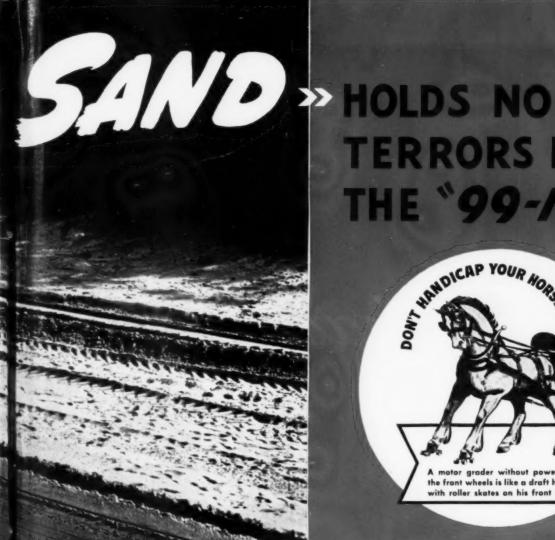
• Building a road through blow sand is probably the most difficult job a motor grader is ever asked to tackle... and there is no tougher sand than that of the famous Dunes at Gary, Indiana. No rear drive motor grader, with its dead front end, has ever succeeded in driving through this sand with blade empty...let alone working in it. The rear drivers spin and bounce in loose sand, and the grader soon becomes stalled.

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The "99M", with its long traction base and properly balanced weight and power, does a beautiful job, and does it so easily as to fool anyone who does not know from practical experience what it means to try to build a road in sand like this.





# TERRORS FOR THE "99-



The photograph above shows the "99M" spreading sand that has been brought up out of the ditch. The live front end of the grader, with its climbing power and large tires, stays on top of the sand, under perfect control. The maximum amount of material is moved up the slope; and the cut is true and smooth because the right rear wheel constantly follows the ditch line.

If you are faced with the problem of grading roads in sand like this . . . if you have tried ordinary motor graders and found them wanting . . . you will find the "99M" the complete solution to your problem. THE AUSTIN-WESTERN ROAD MACHINERY Co., Aurora, Illinois, U.S.A.

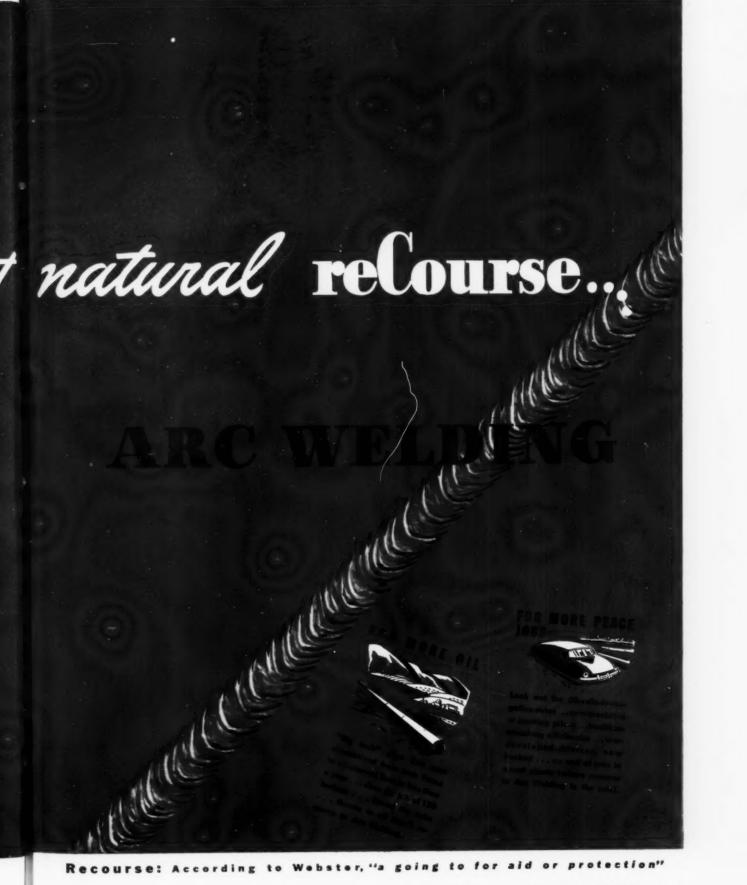
> **BUY MORE** WAR BONDS



# America's greatest n



THE LINCOLN ELECTRIC COMPANY . CLEVELAND, OHIO



# WORLDS



Page 12—CONSTRUCTION METHODS—October 1943

# LARGEST JAU

THE MAN behind *this* plow is the camera man, photographing the bringing to the surface of fertile top soil buried in deep sand by a rampaging river.

To protect the bearings of tractors and other earth-moving equipment, prominent contractors everywhere are lubricating them with Texaco Marfak.

Texaco Marfak protects against wear by providing ideal lubrication with a tough, adhesive film that protects chassis parts against road splash, sealing out sand and grit, sealing itself in the bearing.

In wheel bearings, Texaco Marfak Heavy Duty stays in the bearings — off the brakes — winter and summer.

We believe that it will pay you to call in a Texaco Lubrication Engineer, available through more than 2300 Texaco distributing points in the 48 States. The Texas Company, 135 East 42nd Street, New York 17, N. Y.

#### THEY PREFER TEXACO

★ More Diesel horsepower on streamlined trains in the U. S. is lubricated with Texaco than with all other brands combined.

★ More locomotives and railroad cars in the U. S. are lubricated with Texaco than with any other brand.

\* More revenue airline miles in the

U. S. are flown with Texaco than with any other brand.

★ More buses, more bus lines and more bus-miles are lubricated and fueled with Texaco than with any other brand.

★ More stationary Diesel horsepower in the U. S. is lubricated with Texaco than with any other brand.

TUNE IN THE TEXACO STAR THEATER EVERY SUNDAY NIGHT-CBS

HELP WIN THE WAR BY
RETURNING EMPTY DRUMS PROMPTLY

FAK

# A New Home for Navy Blimps

Two Clyde Steel Stiff Leg Derricks, mounted on 145 foot traveling steel towers, place sectional units of preassembled timber arch trusses for Naval Air Station blimp hangar on Eastern Seaboard.

The 51 trusses have a span of 246 feet, a 170 foot rise and are spaced 20 feet on centers. The hangar will have a ground plan of 1,058 feet by 296.5 feet. As erection progresses, each tower and derrick moves along a pair of railroad tracks spaced 33 feet apart.

Booms of the Clyde derricks are 75 teet long with lifting capacities from 21 tons to 40 tons depending on the operating radius.

Clyde derricks are available in a complete range of sizes from one to 100 tons capacity and are built in guy and stiff leg types.

Clyde derricks are carefully engineered to give the maximum value, quality and performance.



- Periodic inspections
- · Proper adjustments
- Necessary replacements
- Thorough lubrication

. . . will help keep your equipment in good working condition.

#### BUYING WAR BONDS

will help protect your home and your country.



CLYDE DULUTH. IRON

WORKS, INC.

#### ATHEY FORGED-TRAK WHEELS GIVE YOUR LOADS



It's not always fair weather in the earthmoving business and the wise contractor is equipped to keep production going—in weather good or bad! He uses Athey Forged-Trak Trailers and "Caterpillar" Diesel Tractors because heavy loads are supported on smooth, all-weather "pavements of steel" with these dependable earthmoving units.

On soft sand beaches, or new earth fills, where projects are running against time, and delays must be avoided, these all-job trailers are especially essential. They roll heavy loads on schedule and keep production maintained. Their broad-surfaced, steel tracks, built for long life and economical operation, help compact the footing on which loads are hauled.

The need for road maintenance machines in building and maintaining haul roads is greatly reduced with Athey

Trailers.

They lay their own roads — roads of steel — as they go. Thus, there's the saving of machines and men, both of which are in urgent demand in the war

More and more contractors are finding that Athey equipment is job insurance—that they're time and money ahead with these reliable steel tracks under their loads. Have your Athey-"Caterpillar" Dealer give you facts concerning Athey products and about deliveries on new machines. He will be glad to serve you. Athey Truss Wheel Co., Chicago, Illinois.



# Thos AIR TOOLS

You can keep construction moving at an ever faster pace with THOR Air Tools. Basic reasons why THOR tools work harder

struction jobs. For helpful information on the complete line of THOR Contractors Tools write for Catalog No. 42A.

and faster are shown in these typical examples of important con-



## \* Faster Rock Drilling!

#### Because Thor Rock Drills Have:

- Automatic valve assembly that admits exact amount of air needed for efficient operation.
- Powerful rotation provided by extra heavy rifle bar assembly.
- Cushioned steel retainer, fully enclosed and dirt-proof, absorbs drilling shock.
- Full automatic lubrication insures cool, efficient operation.
- "Swing-Feed Cylinder," on stopers, for quick change of water tubes on job.









Disassembled view of Thor Short Travel Tubular Valve.

## \* Faster Demolition!

#### With All These Features of Thor Paving Breakers:

- Specially designed cylinder gives full effect to every hammer blow.
- Extra long piston hammer prevents scoring of piston and cylinder walls.
- Reversible piston for longer service life.
- Drop-forged steel backhead, extra sturdy and rigid for prying operations.
- Cool-handling rubber grips.
- Simple, efficient latch retainer for quick change of accessories.



Sturdy, four bolt backhead of Thor Paving Breaker.

### \* Faster Digging!

#### Thor Clay and Trench Diggers Give You:

- Cylindrical rocker valve provides perfect sealing and control of air pressure for efficient operation.
- "Pigtail Rubber Bumper" excludes dirt, absorbs vibration.
- Self-seating throttle valve insures "full on" and "full off," prevents air leakage.





Thor Pigtail Rubber Bumper, assembled and disassembled.

## Thory SHORT TRAVEL, TUBULAR VALVE BOOSTS OUTPUT, SPEEDS WORK

#### An Exclusive Feature of Thor Air Tools

The Thor Short Travel, Tubular Valve, operating with split second accuracy, exactly measures the quantity of air admitted through openings held to a tolerance of .00025 of an inch. Because of perfect timing the exhaust port is always cut off before the valve opens. No air is wasted. The rapid action enables Thor tools to get the maximum power from every foot of air.



Sectional drawing of Thor Short Travel Tubular Valve.

#### \* Faster Pumping

#### With Thor Sump Pumps You Get:

- Air tight housing that enables motor to operate partially or fully submerged.
- Adjustable throttle varies capacity and speed to needs of job.
- Automatic lubrication keeps all moving parts fully lubricated.
- New design exhaust outlet greatly cuts chance of freezing.



Variable Speed Control on Thor Sump Pump.

#### THOR AIR TOOLS FOR CONTRACTORS

SINKER ROCK DRILLS . STOPER ROCK DRILLS . DRIFTER ROCK DRILLS . PAVING BREAKERS . CLAY AND TRENCH DIGGERS . TAMPERS . SUMP PUMPS . SAWS . GRINDERS.

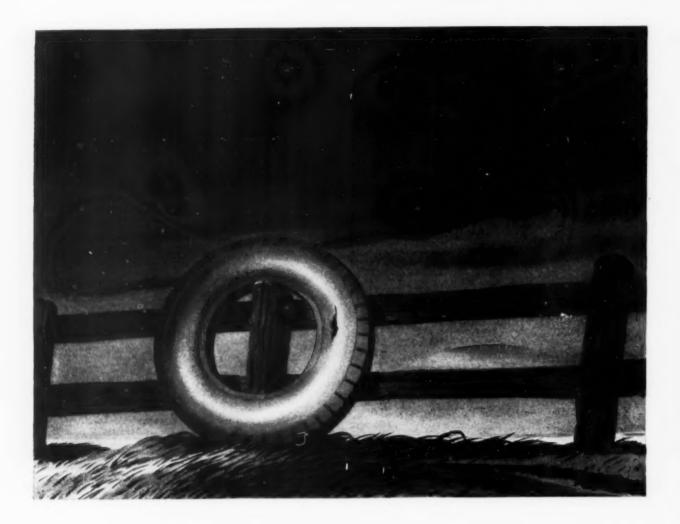


Portable Pneumatic and Electric Tools

INDEPENDENT PNEUMATIC TOOL COMPANY



600 W. JACKSON BOULEVARD, CHICAGO, HL.



#### Life-Saver . . . for Hitler!

HERE'S an almost new tire you'll never see on a wheel. It will never help build war plants, mine ore, reconstruct highways, or carry munitions to the front. Because it won't hold air.

But to Hitler it's a life-saver. To him it means that our war effort has been slowed and that he has gained just so much more precious time.

Yet this costly damage, this waste of rubber and time and effort, need not have happened.

The B. F. Goodrich Company, through 15 years of successful cooperation with operators of bus fleets, discovered how to eliminate most premature tire failures. Around these discoveries they built a scientific Tire Conservation Service that is now available to all fleet operators, including users of off-the-road tires.

This is not just another tire conserva-

tion plan, but a comprehensive, pointby-point program under which factorytrained engineers, working on a fee basis, take over the complete supervision of your tires. One hundred tires or thousands, they give each casing, each inner tube, each vehicle their expert attention. They study your operations as well as your equipment and spot any mechanical or operating

faults which may be causing unusual tire wear. Often their recommendations result in immediate cash savings.

Fleet owners who are already using this low-cost service report savings up to 25%! . . . as much as 60% reduction in tire failures! "We have had only one tire failure in 149,863 vehicle miles," said one big operator.

This plan, based on putting tire maintenance in the hands of trained tire men, was first introduced by The B. F. Goodrich Company, and is another example of the leadership which has made B. F. Goodrich "First in Rubber".

For details on how this low-cost program can be applied to your equipment, write Tire Conservation Department, The B. F. Goodrich Company, Akron, Ohio.





You can buy a new belt in 3 minutes...

The answer is
Preventive Maintenance
now with Shell
Diesel Lubricants





but it may take <u>weeks</u> to replace a worn cam



University Wear of cams. University due to improper lubrication prevents valves from seating properly, causing power loss, and eventually an idle engine. Waiting for replacement parts today, when it's more vital than ever that every piece of

equipment be functioning 100%, is a spot in which no operator wants to find himself.

Many of these cos ly delays can be prevented by proper attention to lubrication. This includes a more careful selection of lubricants . . . more frequent check-ups. These more frequent check-ups may take a little longer, but those few extra minutes spent now will pay you big dividends in the time and money they'll save you later.

Don't wait for trouble to remind you that you should gear your maintenance procedure to wartime tempo. Call in the Shell man now—let him help you plan your Preventive Maintenance.



First oil refinery to win Army Navy "E"— Shell's Wood River Refiner

SHELL DIESEL LUBRICANTS
AND SHELL "DIESELINE"



CORROSION is an enemy saboteur that is constantly trying to destroy your wire rope. Unless combatted by proper lubrication, normal rope life is greatly shortened and a serious hazard to safety created.

Wire Rope is an intricate machine with many "bearings". If it is to give the full service of which it is

actually capable, these points of contact — both externally and internally —must be kept correctly and adequately lubricated at all times.

The right kind of lubricant to use and the frequency with which it should be applied depends upon the conditions under which your rope is operating. When in doubt, we suggest you consult with an experienced wire rope manufacturer.

Now that steel is so urgently needed for so many implements of war, the more "work hours" you can get out of

your wire ropes, the more steel you save for other vital purposes. So in all earnestness we repeat — Don't let Corrosion sabotage your wire rope.

#### · Important

An idle wire rope is more vulnerable to corrosion than one in use, so be sure to give your ropes the protection of a good lubricant when they are not in service.

#### A. LESCHEN & SONS ROPE CO

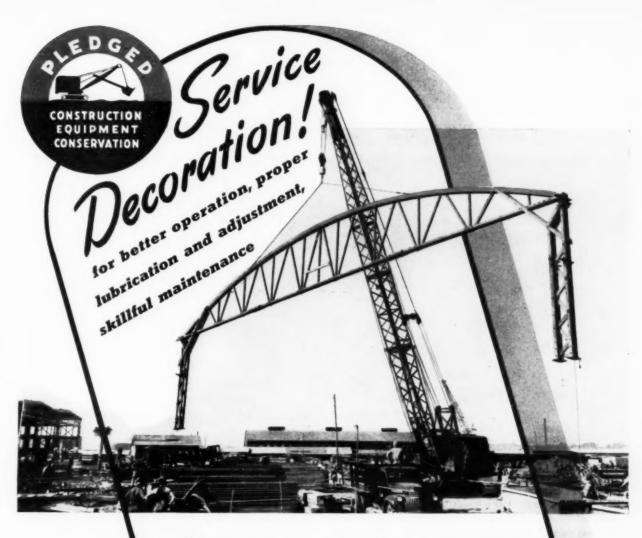
STOP KENNERLY AVENUE

NEW YORK ' ' 90 West Street
CHICAGO ' ' 810 W. Washington Blvd.
DENVER ' ' 1554 Wazee Street



ST. LOUIS, MISSOURI, U.S. A.

SAN FRANCISCO ' 520 Fourth Street
PORTLAND ' 914 N. W. 14th Avenue
SEATTLE ' 3410 First Avenue South



That little red, white, and blue emblem is something for any construction man to be proud of. It's a sign that he's helping to conserve his particular piece of equipment, make it last longer, and still keep up the pace of wartime pressure jobs.

To help Lorain owners and operators to do that job, we have published a 24-page FIX-IT Handbook. It describes practical methods for making emergency repairs; tells how to renovate worn parts so they can be re-used efficiently; will save you time and money, too.

If you haven't received a copy of the FIX-IT Handbook, or if you want one or more free conservation emblems for your shovel, crane, tractor, or truck, clip this coupon and mail it today.

## thew LORAIN

CRANES . SHOVELS
DRAGLINES . MOTO-CRANES



Lorain Model No.

City

Also please and me \_\_\_\_\_\_ (number) of the colorful 5"red, white, and blue Conservation Emblems to display on my equipment.

# 50 TELAS WERE YOU WANT 'EM WITH THE CLEVELAND DR30



Because they drill at any angle and in any direction, there is practically no limit to the settings possible with Cleveland DR30 Wagon Drills. By merely loosening two nuts, DR30's can be swung forward or back, and from side to side. They drill flat holes from 4" to 8' above ground level, as well as straight down, or even straight up where necessary.

This remarkable maneuverability, plus the many important features listed at the right, makes the Cleveland DR30 the most popular wagon drill ever built. Ask for Bulletin 132.

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Birmingham, Ala. Berkeley, Calif. Boston, Mass. Buffalo, N. Y. Butte, Mont. Chicago, Ill. Cincinnati, Ohio Dallas, Texas Denver, Colo.
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Purves E. Ritchie & Son, Ltd., 658 Hornby Street, Vancouver, B. C. Whitehall Machine & Tools, Ltd., Galt, Ontario

BUY U. S. WAR BONDS AND STAMPS

#### THE CLEVELAND ROCK DRILL COMPANY

Division of The Cleveland Pneumatic Tool Company

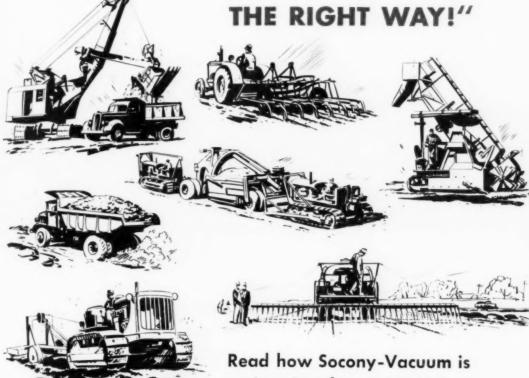
CABLE ADDRESS: "ROCKDRILL"

CLEVELAND 5, OHIO

LEADERS IN DRILLING EQUIPMENT

# "The Right Lubricant -

IN THE RIGHT PLACE,
THE RIGHT WAY!"



Read how Socony-Vacuum is saving time for contractors on hundreds of war-rushed jobs!

The Secret: Fine Lubricants and

#### COMPLETE ENGINEERING SERVICE!

When you buy Socony-Vacuum lubricants, you get many "extras." For Socony-Vacuum service doesn't stop with the delivery of its products. It follows through all the way. It makes certain that you get "The right lubricant, in the right place, the right way."

This means complete engineering service, backed by 77 years of lubrication experience. It means a quality lubricant for every part of every machine you operate. It means

expert help on your maintenance schedules and, when it is necessary, lubrication engineers for your special problems.

Take advantage of all these services. Call your Socony-Vacuum Man now. You'll find he'll help you save time by helping you keep your equipment on the job.

SOCONY-VACUUM OIL CO., INC. and Affiliates: Magnolia Petroleum Co., General Petroleum Corporation of Calif.



SOCONY-VACUUM FUELS, LUBRICANTS AND ENGINEERING SERVICE



COLD weather is a deadly enemy of machinery. At 40° below, ordinary lubricants can actually create friction, ruin expensive bearings and parts and put needed machines out of action.

Safeguard your equipment and keep it "rarin' to go" this winter with Alemite Sub-Zero Lubricant. This lubricant is designed for heavy duty work at extreme cold temperatures—actually protects bearings down to 40° below! It meets government specifications types "D" and "F" applying to Class-14 of General Schedule of Supplies, U. S. Treasury

"Sub-Zero" is one of many Alemite Specialized Lubricants developed to meet out-of-the-ordinary extremes of cold, heat and water. All are proved by years of service to industry. They can help you to meet today's production schedules by prolonging machine life and ending needless breakdowns.

#### Send For Valuable Book!

The Alemite Industrial Lubrication Manual contains answers and specific recommendations to solve literally bundreds of industrial lubrication problems. Write for your FREE copy today.





ALEMITE

Industrial LUBRICATION



Ask Anyon:

1840 Diversey Parkway, Chicago, Illinois · Belleville, Ontario



#### The Last Thousand Feet



Our heavy bombers and the enemy's ack-ack guns are pitted in an endless race for altitude. The last thousand feet make all the difference and present the supreme test of pilot, plane, and equipment. American Bosch magnetos were designed for that last thousand feet . . . built to perform unfailingly far higher than ever before required.

The dependable magnetos flowing from American Bosch assembly lines are the product of *modern* New England craftsmanship. American planes outfly the flak with the help of magnetos made by our *specialist* craftsmen — men and women, 20 to 60 years of age, trained for specific jobs.

The production success of these workmen results from American Bosch engineering, planning, and tooling — the same know-how that helps to get maximum power and service from engines.

In research, design, and production — war or peace — American Bosch serves all branches of the internal combustion engine industry.

AMERICAN BOSCH CORPORATION • SPRINGFIELD, MASSACHUSETTS

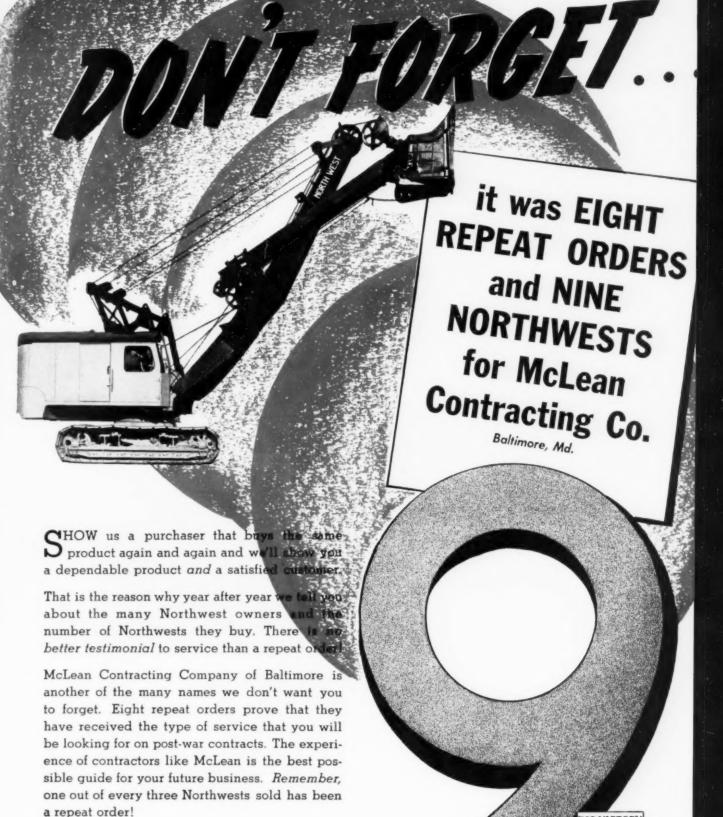
#### **AMERICAN BOSCH**

AVIATION AND AUTOMOTIVE ELECTRICAL PRODUCTS . . . FUEL INJECTION EQUIPMENT



**QUALITY CONTROLLED** to insure greater uniformity in the performance of clutches and brakes.

THE S. K. WELLMAN CO.
1374 East 51st St., Cleveland, Ohio
Pioneers in putting Powder Metallurgy
to work for Industry



NORTHWEST ENGINEERING COMPANY
1728 Steger Building • 28 East Jackson Boulevard • Chicago, Illinois

# "Gulf Quality Lubricants and Fuels are helping us complete this important Flight Strip on Schedule" says Job Superintendent



"Our equipment is run continuously 24 hours a day. We can't permit needless breakdowns . . . that's why we stick to quality petroleum products."

MacDougald Construction Company, Atlanta, Georgia, is working three 8-hour shifts, 7 days a week to complete the airport flight strip pictured above. Keeping "on schedule" involves the grading of upwards of 30,000 yards of earth each day. There is no time for equipment breakdowns or unnecessary delays. That's why job Superintendent Frank Nichols plays safe by using Gulf Quality Petroleum Products.

On job after job throughout the country Gulf Products are playing an enormously important part in keeping contracting equipment rolling under the most punishing conditions. They provide maximum protection to moving parts and insure peak operating efficiency.

You, too, can enjoy the proven benefits provided by Gulf higher quality lubricants and fuels. No matter where your job is located, you are sure of quick delivery through more than 1200 warehouses located in 30 states from Maine to New Mexico. Write or phone your nearest Gulf office today.



GULF OIL CORPORATION
GULF REFINING COMPANY
GULF BUILDING, PITTSBURGH, PA.



Africa with Caterpillar Motor Graders . . . . International News Photo.

Army Air Forces Photo

#### CONSTRUCTION MACHINERY and DIAMOND CHAINS HELP Prepare the Way..

Far away in distant lands, remote from factory service, America's finest construction machinery has shown the world new tricks in the lightning transformation of jungles, deserts, frozen tundra, and slimy wastes into bases, roads, airfields, and in the building of bridges, embankments, sanitary water and sewage systems.

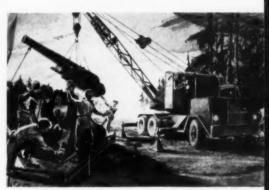
You will find this work going on in Africa, Alaska, Attu, and Australia, in Iceland, India, Iran, and Iraq, in Guadalcanal, New Guinea, China and Sicily. In fact, construction machinery and their tireless crews can claim no small part in the success of the Armed Forces everywhere. They have made possible the rapid transportation of supplies, the fast maneuvers of military equipment and munitions, the quick preparation for airplane offensives.

Diamond Roller Chain Drives, the choice of leading manufacturers of construction machinery, have the drive qualities needed for the tough war assignments, for the long hours of operation under all manner of conditions. They include the short pitch, high speed engine drives - the heavier drives for transferring power to the crawlers, transmissions, hoist drum and conveyor shafts; and the still heavier high strength chains for shovel "crowds".

The machinery you make and the motor drives in your plant may not be put to such strenuous use - but isn't it reasonable to grant that this highly efficient, non-slipping power transmission chain can improve your machinery performance and output? . . . DIAMOND CHAIN & MFG. CO., 418 Kentucky Avenue, Indianapolis 7. Indiana.



Barber-Greene Finishers speed roads and runways.



Thew-Lorain Moto-Crane handling ordnance.



Parsons Trenchers speed sewage

oadway in . . . (censored).

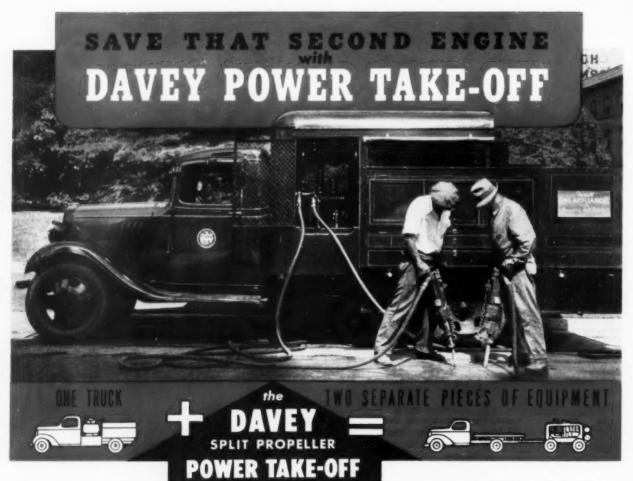
Coffing Hoists aid army emergency

Koehring Wheeler Scrapers make short work of big earth handling jobs.



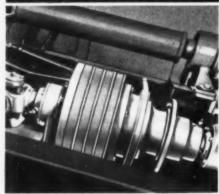


Cardwell side-boom tractor crane handling "Big Inch" pipe



#### HERE'S WHAT IT IS

The DAVEY Power Take-off is a heavy-duty unit for installation in truck drive shafts to operate truck-mounted equipment normally requiring an accessory engine of 10 to 100 HP. It uses as its basic principle an internal and external gear drive, operating as a strong and durable spline rather than the series of rotating or meshing gears found in the transmission type take-off. Installation is made directly to the rear of the truck transmission case. The power take-off then becomes an integral part of the drive-shaft assembly for transmitting power from the truck engine to auxiliary equipment mounted on the truck.



#### HERE'S WHAT IT DOES FOR YOU

It enables you to use truck engine power for operating many types of heavy-duty equipment, among which are:

Air and gas compressors • Generators • Gas well bailers • Concrete mixers
• Agricultural machinery • Portable machine shops • Welders • Pumps •
Street sprinklers • Rock crushers.

#### Here's How Elimination Of Extra Engine Saves MEN . . . MONEY . . . MATERIALS

- 1. Saves space for men, tools and materials.
- 2. Saves weight-doubling truck utility.
- 3. Reduces original investment.
- 4. Lowers maintenance cost—no extra engine.
- 5. Reduces truck license fees.
- Efficient equipment combinations can be mounted on ONE truck.
- Saves manpower equipment controlled from driver's seat.
- No trailer haul, when equipment is truck mounted.
- Long-life unit owners report power takeoff outlasts truck . . . saves own cost in 4 to 10 months.

Write for details of how DAVEY Power Take-offs can make any truck a "TWO-JOB" Truck

#### PART DISTRIBUTED HERES OF PLUST POWER THE OSS SAMPLED

Allentews-Bethlehom Gen Company Besten Consolidated Gen Co. Michigen Consolidated Gen Co. Lane Canatraction Company, Meridon. Cons.

Public Service Electric & Gas Co. of New Jersey

Scranten Spring Brock Water Service Co. Southern California Gas Company Vacuumite Company, Inc., Datter, Torgan

DACKED BY 10 YEARS' PROVED PERFORMANCE



## IST ONE MULTIPLEX DADOING SHAPING ROUTING IN WOOD AND DOES Production of half a dozen specialized machines is com-Production of half a dozen specialized machines is comoperation to another takes only a moment. One out or abstract the article of the control of the operation to another takes only a moment. Whether you want one cut or thousands, the Multiplex will do them fast and thousands. one cut or mousands, the Multiplex will do them tast and accurately. Every shop has places where the Multiplex can speed up production, cut costs, or improve quality of work. VEGA AVENUE. CLEVELAND. OHIO REPRESENTATIVES IN PRINCIPAL CITIES



STERLING EQUIPMENT IS DEPENDABLE... GIVES COMPLETE SATISFACTION

C. a. Channon



#### THERE'S A STERLING DISTRIBUTOR IN YOUR LOCALITY

If you do not know the name of a Sterling Distributor in your locality . . . write us. We'll be glad to tell you who he is and where he is located.

Remember . . . Sterling Equipment is Simple, Dependable and Rugged.

# Hour Sterling Distributor 15 A MAN TO KNOW!

Men like Mr. C. A. Channon, President of the Great Lakes Supply Corporation of Chicago, truthfully say... "Sterling equipment is dependable...gives complete satisfaction". In his work as a Sterling Distributor, Mr. Channon has helped hundreds of contractors and engineers do a better job at less cost through the use of Sterling Pumps, Hoists and Light Plants.

Yes, your Sterling Distributor is a man to know...he maintains a complete staff of maintenance men, engineers, parts specialists, machinists and field men who are ready to serve you. It is this vast organization of trained men, "working behind the front" who are helping our boys in the far flung corners of the world bring Victory nearer day by day.

Call your Sterling Distributor. Let him tell you about Sterling's Rugged Construction, Simple Operation and Dependable Performance. Learn to know the men who are keeping the wheels of progress turning.

Allied Member A. E. D.
Member Contractors Pump Bureau A.G.C.

There's a Sterling Pump for every job. Write today for complete literature and prices.

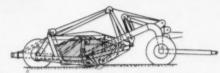
STERLING PUMPS



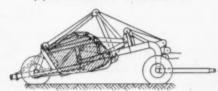


MACHINERY CORPORATION
405-13 SOUTHWEST BLVD. KANSAS CITY 10, MO.

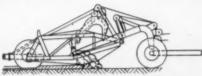
# OVING EARTH FASTER FOR THE UNITED NATIONS LESS POWER TO LOAD



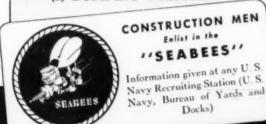
(1) LOADING POSITION



(2) CARRYING POSITION



(3) DUMPING POSITION



GW Cable-Controlled Scrapers provide three ways to speed-up earth moving, do the job in shorter time—and "clear the way" to Victory!

Illustrations, left, show the loading carrying and dumping positions. When loading (1) the line of draft is located to prevent the cutting edge from being pulled out of the ground. Weight is evenly distributed. Boiling action of dirt, loads the bowl and gate with a minimum interference of the material already loaded. In the carrying position (2) the high center clearance of the cutting edge is ideal over soft or uneven ground.

Front portion of load dumps (3) by raising the apron. Remainder of the load is forced out efficiently by positive rolling ejection, as the bottom of the bowl reaches a steep angle, resulting in less cable wear. Wide space between cutting edge and apron permits dumping large sticky loads without interference. The cutting edge remains fixed while dumping, thus providing accurate control of depth of spread.

The GW Road Machinery line is complete—consisting of both Hydraulic and Cable-Operated Units.

SEE YOUR NEAREST ALLIS-CHALMERS DEALER

ROAD MACHINERY DIVISION

GAR WOOD INDUSTRIES, Inc.

# Your New BAY CITY has gone to war . . . .

Your present equipment, working 'round-the-clock will last longer and continue to perform efficiently if these common-sense rules are followed:

insure proper regular lubrication provide daily inspection to detect troubles while they are still small

make adjustments when needed—don't wait

tighten loose bolts and nuts

keep fuel, lubricants and water clean

remove clutch and brake bands and clean lining with good grade of clear gasoline

change cables end-for-end to increase life of wire rope

plan work to favor machine

inspect engine regularly — flush radiator when dirty

always give model and serial numbers when ordering repairs

contact your BAY CITY distributor for parts and service



Photo: U. S. Army Signal Corps

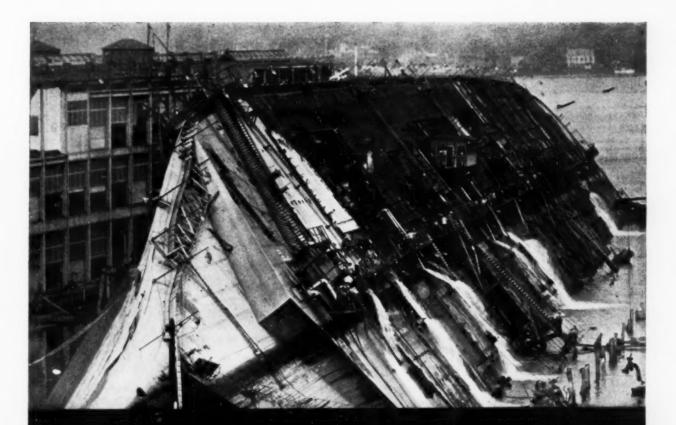
Owners and operators of construction equipment need no reminder that their new machines have gone to war—in many cases they have enlisted for the duration. The many outstanding operating advantages, the easy control, the fine balance, the high performance and the quick convertibility that made BAY CITY your choice for peace-time construction is now in the fight, helping to build the Road to Victory. They are serving on many fronts from the hot sands of Africa to the jungles of the South Pacific. When the war ends you will again be able to put BAY CITY dependable performance on your job. In the meanwhile, we would be glad to send you catalogs so you will have complete details when needed.

BAY CITY SHOVELS, Inc., Bay City, Micbigan



# BAY CITY

SHOVELS . CRANES . DRAGLINES . TRENCH-HOES . SKIMMERS



# Thermoid Products help the "Normandie" float again

To nudge awake the great, stricken hulk of the "Normandie" was a task that called for patient skill—and products of utmost dependability.

In this amazing operation, we are proud to report, Thermoid Products had an important part...round-the-clock service on another important "tough job".

In many fields—and over many years—contractors have been accustomed to "rely on Thermoid". They know that Thermoid Hose (air, water, suction and steam), Thermoid Conveyor Belting, Industrial Brake Linings and other products are built by engineers who understand what you expect and need from Thermoid on really tough, as well as everyday, assignments.

It's good business to do business with Thermoid!

Inermoid Rubber

DIVISION OF THERMOID CO TRENTON, NEW JERSEY

THE THERMOID LINE INCLUDES: Transmission Belting • F. H.P. and Multiple V-Belts and Drives • Conveyor Belting • Elevator Belting • Wrapped and Molded Hose • Sheet Packings • Industrial Brake Linings and Friction Products





THE RECORD: In the first 18 months since

Pearl Harbor, Koss Construction Co., Des Moines, Ia., completed 13 contracts for over 3,500,000 sq. yds. of concrete airport paving (more than 240 miles of 25 ft. slab)-all poured with 34E dual drum pavers followed by Jaeger Paving Teams (25 ft. Screw Spreader and Type

Two of these big pavers were often used with only one Jaeger Spreader-Finisher Team.

THE REPORT: Mr. Richard Koss states: "At no time has this Jaeger equipment failed to keep up with the production of two pavers and this includes all types of weather from the very hottest days to the coldest winter days that we poured concrete . . . In spite of the large amount of yardage laid, the machines are still in excellent shape."

THE VERDICT: For today's - and tomorrow's - paving needs (steady, high production with small crews) use the Mechanized Paving Team, originated by Jaeger.

#### THE JAEGER MACHINE COMPANY

800 Dublin Ave., Columbus 16, Ohio

ALSO MIXERS - PUMPS - HOISTS - TRUCK MIXERS

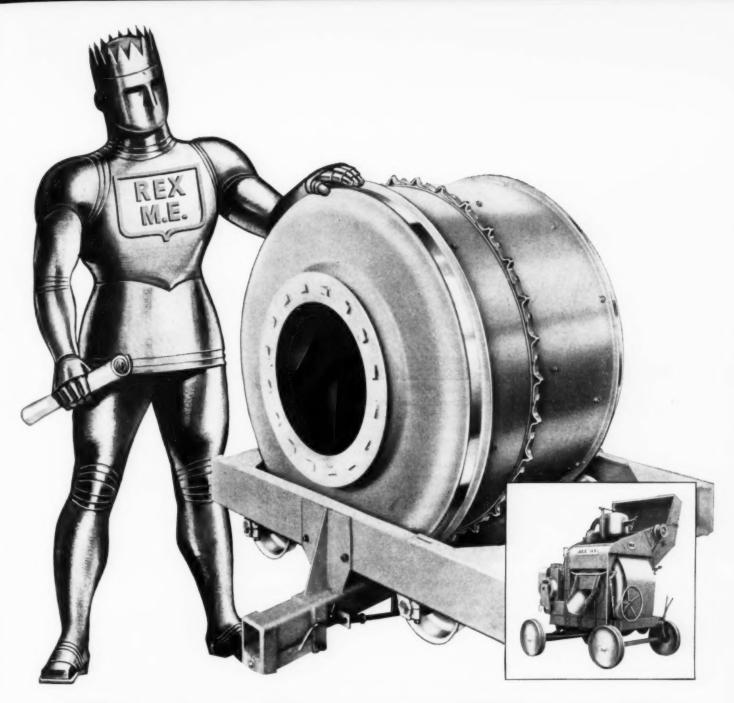




800 Dublin Avenue, Columbus 16, Ohio



Page 38 — CONSTRUCTION METHODS — October 1943



#### HIS design adds years to REX mixer life

Long life, low maintenance, efficient operation—these features are engineered into every Rex concrete mixer. For Rex Mechanical Engineering—Rex M. E.—has always kept the *user* in mind in designing his mixers. He has omitted nothing that would assure lower mixing costs—and more efficient operation.

For example, the Rex Drum. Drum heads are pressed steel, die formed and welded integrally with the center sheet, eliminating pounds of "excess baggage." Die formed, pressed steel drum rollers equipped with adjustable bearings which have threaded collars and splined keys—true precision construction! Accurately formed track and rollers support the load without distortion and maintain perfect alignment through years of tough service—develop no flat spots!

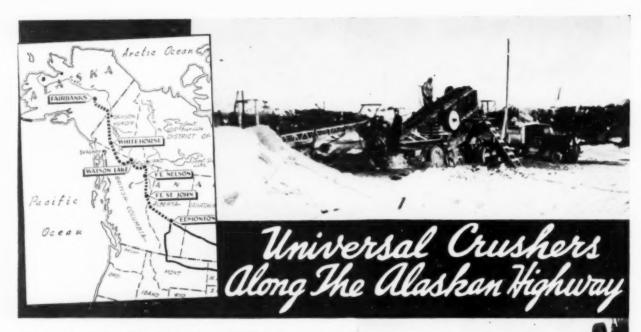
Rex Mixers have other quality features, too! "Multi-Shake Shimmy Skip" gets the batch into the drum faster ... Rex Water system—nearly 100% accurate ... Rex 3-Way mixing action ... all features engineered into Rex Concrete Mixers to give their users greater service.

For complete information write Chain Belt Company, 1664 West Bruce Street, Milwaukee 4, Wisconsin. Ask for Bulletin No. 380.



### CONSTRUCTION MACHINERY

Concrete Mixers • Moto-Mixers • Pumpcretes • Pavers Mortar and Plaster Mixers • Speed Prime Pumps



The prevalence of Universal Crushing, Screening and Loading Plants — both stationary and portable—along the Alaska Highway, is an added reason why this tremendous undertaking is being completed so rapidly. Universals are "just what the doctor ordered" for a project like this—easy to move from pit to pit; toughness to slug it out day after day (important when you're thousands of miles from replacement parts); maximum yardage per gallon of fuel consumed.

Shown are some of the Universals working on this strategic military highway that will throw open a vast territory for post-war development.

- Universal Portable Crushing and Screening Plant of Adolphson & Huseth, Layser & Welch, contractors from Minneapolis.
- (2) Universal 20"x36" Primary Crushing Unit of Volck Construction Co. from Rice Lake, Wisc.
- (3) Universal Rock Crushing Plant with apron feeder of Mike Welch, contractor from Annandale, Minn.
- (4) Another view of Universal Plant supplying stock piles, owned by Mike Welch.
- (5) Universal Gravel Crushing and Screening Plant of Roverud Bros. from Spring Grove, Minn.

Universal Engineering Corp.

(formerly Universal Crusher Co.) 327 8th Street West, Cedar Rapids, Ia.



The U. S. Army Engineers need construction men, skilled mechanics, technicians. Apply to your nearest recruiting office.







CRUSHERS, PULVERIZERS, COMPLETE PLANTS, SPREADEROLLERS, PORTABLE ASPHALT PLANTS





No field offers a better opportunity for synergistic thinking than blasting. Here the interchange of ideas in overcoming problems can uncover a world of "plus" values . . . new and better methods and devices, greater production, lower costs.

Consider the problem of conserving irreplaceable equipment when the accent is on production. Using a little more powder is not necessarily a waste today—it may get longer, more efficient life from your equipment.

Maybe you don't need *more* powder, but do need a *different* powder. This, conceivably, could mean even less powder.

Synergism can give a "2 + 2 = 5" answer. Over a hundred grades of Atlas explosives are available. Their range of effectiveness is limited only by the synergistic thinking applied to them.

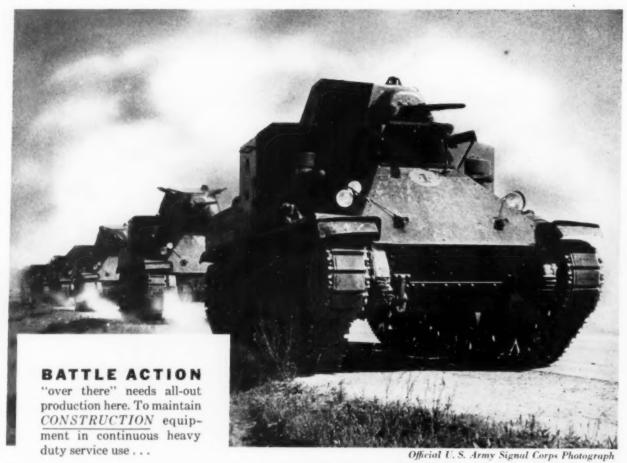
If you have a blasting problem, we would like to try synergistic thinking with you.

\*Synergism—the meeting of minds "clicking together" from the impact of ideas to give a result greater than the sum total of the ideas expressed—a"2 plus 2 equals 5" result. Synergism is a big help in making your equipment last longer.

# ATLAS EXPLOSIVES "Everything for Blasting"



ATLAS POWDER COMPANY, Wilmington 99, Del. · Offices in principal cities · Cable Address-Atpowco



#### SINCLAIR SPECIAL-IZED LUBRICANTS.

Sinclair gear oils and greases are highly efficient in wet or dry operating conditions. Sinclair Pennsylvania or Opaline Motor Oils give lubricating protection that prevents forced shut-downs. There's a Sinclair lubricant for correct service in every type of machinery.

Write for "The Service Factor"—a free publication devoted to the solution of lubricating problems.



## SINCLAIR LUBRICANTS-FUELS

FOR FULL INFORMATION OR LUBRICATION COUNSEL WRITE SINCLAIR REFINING COMPANY (INC.), 630 FIFTH AVENUE, NEW YORK 20, N. 3



From the bleak cold Arctic to the hot dusty deserts and dark muggy jungles of the tropics, Wooldridge Terra Clipper Scrapers have made their mark in building roads, advance bases, and airfields for the Allies' fighting forces. Operating under the most extremely adverse conditions, handling rock, shale, sand, and damp earth, etc., Wooldridge Terra Clipper Scrapers keep up a faster pace, moving extra yardage loads with fewer delays and less time out for repairs. When this war is won, Wooldridge Scrapers will again be back on the job building high-speed highways, leveling, filling and moving giant loads of dirt. Start planning now to use Wooldridge equipment on the limitless post-war earth-moving projects that are in prospect.

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SCRAPERS . POWER UNITS . BULLDOZERS . RIPPERS . TRAIL BUILDERS

WOOLDRIDGE Heavy Duty Earth-moving Scrapers are built in sizes ranging from 4 to 30 cu. yd. capacities. They are supplied to the United States Government for essential war jobs, for two line operation permitting two drum power units to be used. WOOLDRIDGE Scrapers operate on the pivot-tilt forced load ejection principle.

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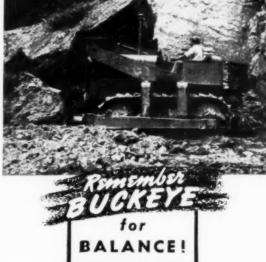
## ... and it's worth keeping!

THE leading tractor manufacturers have invested millions of dollars perfecting and refining their machines to give you, among other advantages, engineered balance for maximum performance.

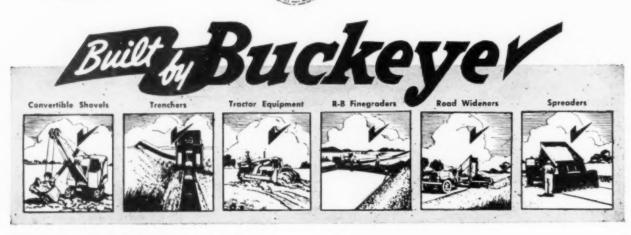
Buckeye Cable Controlled Tractor Equipment is correctly designed to maintain that balance when installed on your tractors.

Buckeye builds a dozer and power control unit for every standard make and model of tractor, each designed specially for the tractor with which it is to be used.

In the future when you consider dozer equipment, remember Buckeye for balance.



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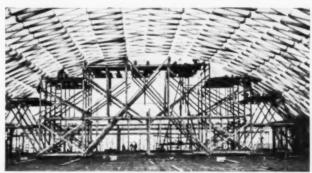




## TIME IS IMPORTANT-USE TIMBER STRUCTURES

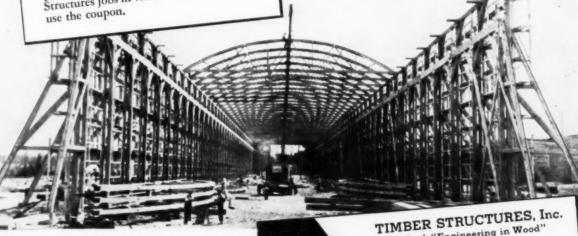
Buildings are erected quickly when you specify roof trusses by Timber Structures. Coupled with construction speed are advantages of economy, strength, permanence.

This organization specializes on design, fabrication, assembly and erection of truses and other timber items. All types of industrial contents of the contents industrial construction are served-from small business buildings, bridges and fac-tories to huge army depots and aviation housing. We welcome the opportunity of submitting suggestions on trusses of timber or other structural materials in your projects. For illustrated book of Timber Structures jobs in various industries please SHIPYARDS are rush jobs, Timber Structures, Inc. designed, fabricated and



IN 10 DAYS the Lamella type roof was erected for this 100'x80' army sports arena. Designed by U.S. Engineers. Contractor: Henry Boyer Son & Co., Olympia, Wn.

BY ADAPTING CUSTOMER'S EQUIPMENT already on the premisesthus cutting waste motion and expense—the 46-94' trusses on this storage shed for Shevlin-Hixon Lumber Co., Bend, Oregon, were economically erected in a few days. Building designed and supervised by Gerry Horskotte, Shelvin-Hixon Engineer.



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# your <u>silent</u> partner

Prior to 1939, all ore from the vast Mesabi iron range—largest iron producing area in the world moved from pit to dock by rail.

Today, a conservatively estimated 30 to 40% of the Mesabi's total tonnage—now greatly increased to meet war-time demands—rolls on rubber . . . in giant trucks, of which the large majority

If your job is commercial fishing, petroleum are Cummins Diesel-powered! production, logging, highway or waterway transportation, construction, mining or one of many others in which the Cummins Dependable Diesel has been so long established, you'll readily understand why this particular diesel is so widely used

But, regardless of what your job may be, you know that iron ore and the steel it produces is the on the iron range. backbone of all industry. Thus, in helping to produce ore from the Mesabi-faster and cheaper than it's ever been produced before—Cummins Diesel power has become a silent partner on every war job in America . . . working always toward one end . . . working always toward Victory. Cummins ENGINE COMPANY, Columbus, Indiana.

While new engines are scarce, try to "make the old ones do" by while new engines are scarce, try to "make the old ones do" by careful maintenance and service. Your Cummins dealer is eager to help and his complete service facilities are available day and night.



#### THE SPEED THAT COUNTS IN WAR PROJECT CONSTRUCTION In wartime, more than ever, it's the power and speed that counts. Koehring speed and power saves seconds in shovel operations . . . the surest way to increase production. Victory demands a greater output, and Koehring Shovels Depend have the reserve power to provide it. on your Koeh-The wartime service needed is availring distributor to help you able in your Koehring Shovel with little keep your equipment opertime out for breakdown or repair. Be ating. Care for your Koehsure to keep your shovel well lubricatring equipment NOW, so it ed . . . replace worn parts before failure will serve you tomorrow. ... never misuse your shovel in any Koehring distributors have way...and it will exhibit a performance genuine Koehring parts. Koehring parts warehouses that counts in increasing production. are at your service. KOEHRING COMPANY Milwaukee. Wisconsin

## OFF-THE-ROAD—

 $\mathbf{Y}^{\text{OU}}$  can't be too careful about the tires for your earth-moving equipment.

Through the years, Goodyear has led in the development of off-the-road tires with more traction, more speed and more pull. Today these tires are serving everywhere in the war effort.

Goodyear tires have been designed and constructed for every type of terrain, for every type of off-the-road equipment.

THE BIG THREE (All built with Goodyear's own multiplecompounded construction and low-stretch Supertwist Cord)

GOODYEAR
HARD ROCK LUG
for all rock work

GOODYEAR SURE-GRIP GRADER for mud and marsh

> GOODYEAR ALL-WEATHER EARTH-MOVER for drawn dirt-movers

Look at the Big Three below—the Goodyear Sure-Grip Grader for mud and marsh. the Goodyear Hard Rock Lug for rock work, and the Goodyear All-Weather Earth-Mover for drawn dirt-movers.

These special treads all are built on Goodyear's own low-stretch Supertwist Cord carcass by Goodyear's own multiple-compounded construction. They have proved how they can take punishment and deliver the most tons farthest both before and after recapping.

You are certain of the maximum amount of live rubber allowed by the government, plus long-accumulated Goodyear tire-making "know-how," when you use your tire certificate to invest in Goodyears. They've got what

it takes.

Sure-Grip, All Weather, Supertwist -T. M.'s The Goodyear Tire &

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GOOD YEAR

THE GREATEST NAME
IN RUBBER

MORE TONS ARE HAULED ON GOODYEAR TRUCK TIRES THAN ON ANY

## Construction Methods

ROBERT K. TOMLIN, Editor

Volume 24

OCTOBER 1943

Number 10



SYNTHETIC RESIN GLUE is painted on studding of Kaiser dormitory for shipyard workers at Swan Island, Ore., to hold exterior plasterboard providing continuous bond.



DOUBLE-THICK PANELS of Gyplap plasterboard, 2x8 ft. in size and weighing 65 lb., are glued to studding of building, making necessary only one-third number of nails ordinarily required.

## Glued Plasterboard

#### SHEATHES DORMITORIES FOR KAISER SHIPYARD WORKERS

WITH THE ADOPTION OF many new types of exterior construction for homes and buildings, contractors are finding new uses for glue as a construction material. One of the most successful has been the gluing of exterior plasterboard in the erection of dormitories in the three large dormitory housing projects for Henry J. Kaiser workmen in the Portland, Ore., area.

These buildings are being constructed under supervision of the U. S. Maritime Commission at a total cost of \$6,750,000 and when completed will provide living quarters for 11,000 single persons. The contract is divided into three parts—2,000-unit dormitories at Swan Island, 2,000 at Oregon Shipbuilding Corp. and 7,000 units at Vancouver Shipyards.

Plasterboard used was U. S. Gypsum Co.'s Gyplap, glued to the studding with Lauxite synthetic resin glue. This waterproof glue, painted on to the studding by workmen, increases the efficiency of the exterior plasterboard by reducing the number of nail hole punctures in the boards' surfaces. In addition to the advantage of giving a continuous bond, only one-third of the regular number of nails was used in this glued construction.

The Gyplap was specified in 2x8-ft. double-thick sections with lapped joints. Exterior of the board was protected with a prime coat of Laux Rez, pigmented with Dutch Boy lead paste. This was covered with two coats of Laux Rezitex, which has been adopted as a standard finish for exteriors of homes and buildings in Kaiser's projects. The general effect of Rezitex is to give the buildings a stucco-like appearance.

Interiors of the buildings were constructed of U. S. Gypsum prefinished plasterboard, also glued to the studding with Laucks construction glue.

General contractors for the projects are Reimers & Jolivette, architects are Wolff & Phillips, paint contractors are Williamson & Bleid and Frank Stepanek is the plasterboard contractor.



# THIS MONTH'S NEWS REEL

FIRST COMPLETE SHIP entirely paid for by war bonds purchased by Calship workers is S.S. Henry M. Robinson. MARY PICKFORD places last section in model, assisted by LARRY WILLIAMS, U. S. Marine Corps, at ceremony in front of big delivered freighter. Workers pledged themselves to buy a ship a month with war bonds.

WIDE WORLD PHOTO

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COMPLETION OF PEACE RIVER BRIDGE on route of Alaska Military Highway near St. John, B. C., is celebrated Aug. 30 at dinner in Trenton. N. J., by John A. Roebling's Sons Co., contractor for superstructure of permanent cable suspension span (replacing temporary trestle bridge), built under adverse conditions in record time of 7 months after contract with Public Roads Administration was signed. Bridge, with overall length of 2.130 ft. and 24-ft. roadway, has 930-ft. main channel span, two 465-ft. loaded back-stay spans and two 135-ft. deck truss spans, one at each end. Members of Roebling organization and quests at speakers' table included: (Seated, left to right) C. G. WILLIAMS, executive vice president. Roebling; BRIG. GEN. DAVID Mc-COACH, JR., Assistant Chief of Engineers, U. S. Army; JOHN A. ROEBLING, grandson of founder of company and son of the late Col, Washington

A. Roebling: L. H. BOYKIN, Deputy Commissioner, Public Roads Administration: W. A. ANDERSON, president of Roebling company. (Standing, left to right) CHARLES A. EATON, JR., executive vice president, New Jersey Chamber of Commerce;

BLAIR BIRDSALL, Assistant Chief Engineer, Roebling Bridge Department; C. C. SUNDERLAND, Chief Engineer, Roebling Bridge Department; ANDREW J. DUCH, Mayor of Trenton, N. J.: and HENRY W. JOHNSON, president, N. J. Manufacturers' Association.



CONCRETE AND STEEL (left) form face of huge Dale Hollow Dam, which will trap and back up Tennessee's Obey River to flood 26.000 acres in seven counties in two states. Now nearing completion by Morrison-Knudsen Co., Inc., of Boise, Idaho, project battled river which twisted and bent steel girders and trestle work, tore cofferdam and tossed temporary barge bridge on banks.



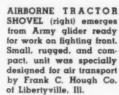


DEEPEST FRESH WATER DIVE EVER RECORDED is credited to COLIN O'DONNELL, veteran Pacific Coast deep-sea diver, under U. S. Bureau of Reclamation contract. He descended 275 ft. into cold waters of Columbia River along upstream face of Grand Coulee Dam to remove obstruction which prevented operation of penstock coaster gate of one of dam's giant turbines. Power plant is rated world's largest hydro-electric installation.



SICILIAN WHEAT FIELD (below) is transformed in record time into advance landing ground for R.A.F. Spitfires. Troops first harvested wheat, then cleared field and prepared it for service as airfield.

BRITISH COMBINE PHOTO







HOW TO MAKE YOUR MONEY WORK TWICE is interpreted in painting by Boris Artzybasheff (left), which points out that dollars give double service if changed into war bonds. Picture is part of contribution to Third War Loan Drive by Wickwire Spencer Steel Co., of New York.

BOMBER BASE CONSTRUCTION IN GREAT BRITAIN by American Army Engineer troops is speeded with aid of American mechanical equipment. Here pair of 34E Foote paving mixers operate side by side in placing concrete slabs in 20-ft. lanes for runways having widths of 140 to 150 ft. In background at left is batching plant which uses bulk cement and is charged with aggregate by truck-crane. Trucks deliver batches to paver skips.

RELIEVING MANPOWER SHORTAGE, women (below) take ship-building jobs, with LUCIUS EVANS, instructor at Calship Yards in Los Angeles, teaching them technique of acetylene torch burning. Paid while training, girls will earn about \$60 weekly after graduation into yard. Reports show that girls over 18 compete favorably with men in many jobs, including welding and burning.

WIDE WORLD PHOTO





# ARMY CONSTRUCTION in the Middle East

Completed by Johnson, Drake & Piper,
Inc. Under Contract with Corps of
Engineers, Involving Tough Work in
Foreign Lands Under Blistering Tropical Sun

CAMEL CARTS are employed by contractor for transport of construction materials for air bases.

IN SHADOW OF PYRAMIDS, general manager for Johnson. Drake & Piper, Inc., "BOB" BAYARD (right) inspects Egyptian terrain from camel's back.

IN NATIVE GARB (below) laborers build railroad track to warehouses newly constructed to serve naval base.



This is an account of how an American contractor's organization, in the face of unusual difficulties, accomplished its mission of construction for the Allied Armies in the Middle East, as told by Robert P. Bayard, general manager, Johnson, Drake & Piper, Inc., to Robert K. Tomlin, Editor, Construction Methods.

In theatres of war overseas, construction projects for the Army, similar to those built by contract and illustrated herewith, will henceforth be handled directly by the Corps of Engineers, using Engineer regiments of construction specialists for which 100,000 qualified recruits are needed. Apply at nearest U. S. District Engineer Office.



WORKING JUST OFF-STAGE in the theatre of war in the Middle East and beset by all manner of difficulties incident to a large-scale program of construction in foreign lands-heat of torrid intensity, lack of equipment and supplies, inadequate transportation and communication, untrained native labor, a babel of alien tongues and strange civil and religious customs-construction forces of Johnson, Drake & Piper, Inc., of New York, led by Robert P. Bayard, general manager, and operating under a contract with the Corps of Engineers, U. S. Army, won an outstanding victory in a grueling 11/2-year campaign to produce the wide range of structures and services urgently needed by the Allied Armies in North Africa, Palestine and Arabia. Theirs was no comfortable long-range view of desert warfare, for when Field Marshal Rommel and his Axis tank forces had driven eastward across the Libyan desert almost to the gates of Cairo this crew of hardy American construction men were hurriedly evacuated to points of safety as the British forces halted the enemy advance. Then, returning to their jobs, they completed the building of airports, naval bases, roads, assembly and repair plants, warehouses, hospitals, ammunition depots, barracks and the scores of other facilities needed to service the fighting forces of modern warfare.

of

in

Having accomplished their mission of construction in the Middle East, members of the Johnson, Drake & Piper organization returned recently to the United States and the following account of what they refer to as their "African Venture" is based on information supplied to Construction Methods by Robert P. Bayard, who was in charge of the various projects for the contractor, under the direction of



NATIVE LABOR in long robes and turbans builds barracks for 6.000 men at big repair depot.

the U. S. Army Engineers, operating through the North Atlantic Division, with headquarters in New York, and the African District Office in Cairo, Egypt.

Construction work for the Army in the Middle East was undertaken originally as an aid to the British 8th Army in North Africa (and later the American Ninth Air Force) under a War Department contract executed in November, 1941. At that time it was impossible to

specify in detail the scope of the program of construction contemplated and the precise location of its various elements. The contract, therefore, was without definite geographical or physical limits.

With a sketchy outline of the work to be done, a skeleton organization of key personnel was formed in New York to plan, in collaboration with the Army Engineers, how the projects in the Middle East were to be handled and to provide

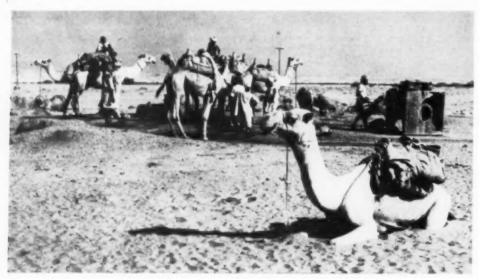
SALVAGE OF FLOATING DRYDOCK (below) in harbor is completed after scuttling by Italians prior to British occupation.

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CONCRETE FLOOR of structure at munitions dump is poured by bucket from boom of Koehring crawler crane, shipped from United States.



CAMELS are loaded with water for delivery across desert to construction crew.

NATIVE AFRICAN LABOR wheels barrows of sand and stone up ramp at concrete mixing plant.



for essential requirements of men, equipment, materials, spare parts, food, clothing and medical supplies. A major responsibility involved the careful selection of personnel equipped both physically and mentally to stand up under the punishing conditions of climate, tropical disease hazards and round-the-clock hard work in unfamiliar settings that would govern the operations in Africa and other foreign lands.

#### Work Begun in Eritrea

Within a month after the signing of the contract, however, all preliminary arrangements had been completed and a reconnaissance party of five of the contractor's ace construction men left by airplane from the United States with the intention of sizing up the situation in Africa and reporting back to headquarters in New York as a guide to future operations. Because of congestion in transportation facilities by both ship and airplane, however, this advance guard reached Eritrea on the East Coast of Africa only a few days before the arrival in February, 1942, of the first large shipment of 169 men of the contractor's forces, in addition to Corps of Engineer personnel. With the assistance of the British Army and its Occupied Enemy Territory Administration, headquarters were established in an Italian hotel in the mountain plateau region of Eritrea and field work was started on a nearby project using materials salvaged from former Italian military set-ups.

Labor was supplied by Italian prisoners of war, Italian civilians and Eritrean natives. The Italians were friendly and proved to be good workmen and ingenious mechanically. Among the Italian prisoners were many men of talent—engineers, architects, mechanics, diesel engine specialists, as well as musicians and artisans. On one occasion a rich tenor voice emerged from one of the camp kitchens, and upon a checkup it was found that it belonged to an Italian prisoner. He was only too glad to gather

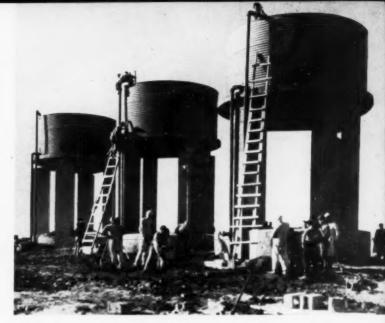
MOTOR PATROL GRADER spreads bituminous mix for surfacing airport runway at base.



Page 54 — CONSTRUCTION METHODS — October



PAYOFF OF NATIVE LABOR is handled by Johnson, Drake & Piper paymaster stripped to the waist to obtain relief in torrid climate.



ELEVATED WATER TANKS of corrugated metal on masonry block columns are erected to serve repair depot project.

together a few of his musical friends from among his fellow prisoners and from this nucleus was formed a musical unit which toured the various camps and provided some very effective and cheap entertainment for the men.

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In Eritrea the contractor employed thousands of natives, most of them of the Coptic faith. With skinny arms and legs, protruding foreheads and sunken eyes, they appeared to have suffered from malnutrition and were found to be incapable of performing hard physical labor. In contrast to the native Eritreans, the strong, tall Sudanese were good workmen as were the Yemmenites, from southwest Arabia, who were particularly useful around ships and docks.

In April, 1942 the contractor's personnel was reinforced by the arrival of an additional 110 men, bringing the total to 284. By this time about 10,000 Italians and African natives were employed and construction equipment and supplies had begun to arrive from the United States. Later, in July, 600 more men reached



ROAD BUILDING was part of repair depot project. Natives deliver crushed stone in wicker baskets.

NATIVES (below) lay stone base for new highway.









WITH UNDER-WATER CUTTING TORCH diver descends into harbor to salvage drydocks and ships scuttled by Italians before British occupation.



STONE CRUSHING PLANT at quarry serving construction project is operated by native labor.



CONCRETE BLOCKS are used for foundation walls of cold storage plant at naval base.

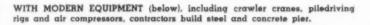
Africa from the United States and as the scope of the work expanded all directives governing construction operations were issued from Army headquarters at Cairo.

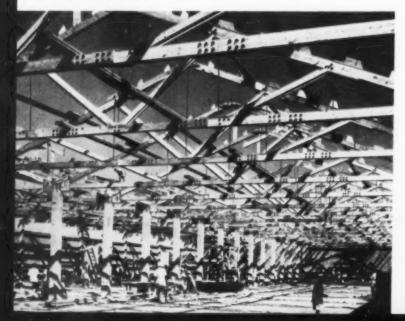
Among the first large-scale projects undertaken was an American-built airbase in Eritrea, comprising a landing field, assembly and overhaul plant involving shops of all sorts, housing and recreation facilities, hangars, hospitals, roads, water supply and drainage. At the site of the naval base the Italians had scuttled two floating drydocks and many ships to block the harbor entrance and the dock fronts before the occupation of Eritrea by the British.

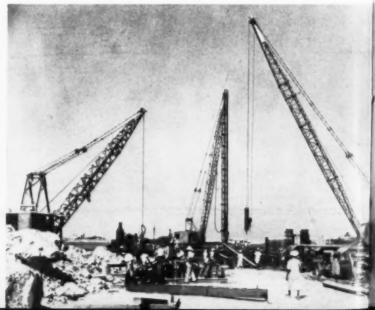
The salvage or removal of these craft was one of the jobs that the Johnson, Drake & Piper organization was called upon to handle under the technical supervision of Capt. Edward Ellsberg, U. S. Navy. For this task salvage experts and tugs especially equipped for this work had to be rounded up from all over the world. The two drydocks were success-

Page 56

TIMBER TRUSSES (below) with bolted connections are set in place to support roof of shop building.







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REINFORCED CONCRETE STRUCTURE below ground level, to be covered by earth fill for concealment, will house radio transmitter station in plateau region.

fully floated and repair work on them was started. Stocks of repair supplies were lacking and had either to be improvised or borrowed from the British. It was not long, however, before Allied merchant ships were being drydocked, reconditioned, scraped and repainted after long periods of neglect. All scuttled vessels that prevented normal harbor operation were either raised or cleared by December, 1942, when the salvage crew and their equipment were ordered to proceed to Oran, which had just been occupied by the American armed forces.

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Among scores of smaller projects completed were the rehabilitation and enlargement of a former Italian radio station, including the installation of tall radio towers, the remodeling and enlargement of warehouses, and the reconstruction and realignment of a tortuous Italian highway along a mountainside.



At a site in Egypt, construction work was started in April, 1943, on a general repair depot, with the usual scarcity of equipment and materials as a deterrent to rapid progress. American designs for the various structures had to be modified extensively to adapt them to the use of such local materials as were available. Local Egyptian labor was obtained through a British agency at standard wages for various labor classifications. The project consisted primarily of a camp to house 10,000 men, complete overhaul and repair shops for Ordnance, Quartermaster, Engineer and Signal Corps equipment, a diesel locomotive repair shop and school for training native operators, and a 1,000-bed hospital. To serve this large establishment a water supply system had to be provided and asphalt, gravel and concrete roads built. Today this depot is performing useful service for the Allied armies.

It was on this project that the American construction workers had to be hurriedly evacuated by truck, boat or plane



CONCRETE BATCHING PLANT and aggregate screening outfit is set up to serve construction of large camp in Middle East.

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PORTABLE CRUSHING PLANT (below) supplies stone for big building project.





STEEL FRAMEWORK will house one of the shops for a big assembly and



LIGHT STEEL FRAME is erected for warehouse at rest camp project provided for military use.



HEAVY-DUTY EQUIPMENT for contractor's use reached Africa in spite of en emy submarine menace. Here Bucyrus-Erie power shovel loads truck.



CONCRETE BLOCK PLANT was set up to provide structural units for constructing buildings at air base.

to Eritrea, Khartoum or other points up the River Nile just before the British armies stopped the advance upon Cairo of Field Marshal Rommel and his Axis forces. After about 10 days, however, the Johnson, Drake & Piper crew were back on the job, although it took several weeks to reassemble or replace the scatforce of Egyptian laborers. Throughout the work the contractor's administrative organization was critically

understaffed in such classifications as timekeepers, clerks, paymasters, and sorely needed truck drivers and equipment operators had to be drafted and trained for those services.

#### Arabian Air Route Bases

Here the construction work itself was simple but the job was rendered difficult by the lack of those things ordinarily

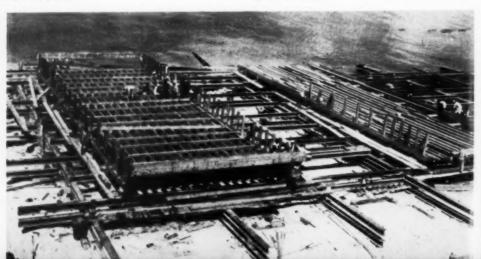
taken for granted in the United Statestransportation, food, water and shelter. It was on this Arabian project that an ingenious general superintendent for Johnson, Drake & Piper discovered an effective method of getting the best work out of one of his native foremen whose construction crews were working at a very leisurely pace. The American superintendent went into the open market and,

(Continued on page 138)

TURBANED NATIVES (left) watch big Lima drag-

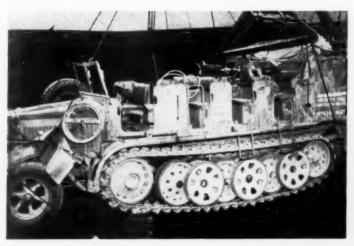
WOODEN BARGES (below) are constructed on ways for launching by American workmen aided by native labor.





line load General Motors truck with earth fill for repair depot job.

# oddities |



GERMAN TROOP CARRIER CAR equipped with crawler treads, captured in North Africa, is swung ashore in United States port. It will be tested by Army experts at Aberdeen Proving Grounds, Md.

Press Association Photo

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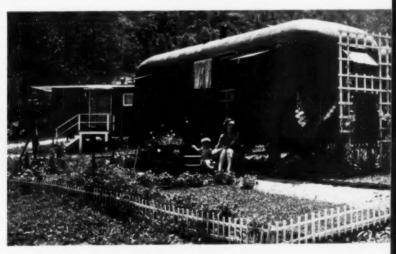
and,

FIRST CHINESE WOMAN WELDER (below) at Federal Shipbuilding & Dry Dock Co. Shipyards, of Port Newark, N. J., is MAY WONG. American-born, she formerly had position as draftswoman for firm of ship designers.

Wide Werld Photo



TRANSPLANTED FROM SEASHORE TO SHIP DECK, beach umbrellas provide protection from broiling sun for welders working on 225th Liberty ship launched by California Shipbuilding Corp. on Terminal Island, Wilmington, Calif. Yard made record by delivering 25 ships in month.



FIRST PRIZE FOR TRAILERS in Community Pride Week competition at Fontana Village, which houses workers on TVA's Fontana Dam, is won by trailer owned by A. L. Stedman, concrete inspector. Tiny Victory Garden grows in corner of 25x40-ft. front yard.

DIFFICULT TO DETECT amid foliage of tree in New Caledonia is this Combat Engineer sniper (below) wearing new army jungle suit of mottled coloring which blends effectively with background.

Army Signal Corps Photo







BALLAST GANG tamps limestone under and around ties with Ingersoll-Rand tie tampers drawing air at 100-lb. pressure from Gardner-Denver compressor mounted on self-propelled railroad car. This outfit operates eight tampers. Workman at left carries portable Dobbins drinking fountain equipped and container for Vortex paper cups. Filled with 5 gal. of water, tank weighs 48 lb.



42 MILES OF RAILROAD TRACK constitutes a major item in construction of large naval supply depot. Each of 55 storehouses has track on one side and highway on other. Crane is here handling limestone ballast out of gondola cars on to roadbed.

#### Page 60

SECOND 4-IN. COURSE (below) of crushed rock for pavement base is deposited in uniform layer by Jaeger adjustable spreader drawn forward by two cables attached to Caterpillar DW10 diesel wheel tractor weighted with steel rails. Pavement is completed with 3-in. penetration macadam top course on which wearing surface is built up by four cold applications totalling 2.55 gal. of asphalt emulsion. with stone screenings spread and rolled into each application.

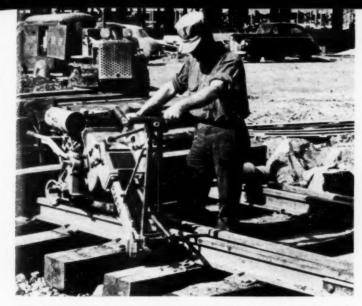
Track Gangs
and
Road Crews
Use Power Machines
On Large
Navy Project



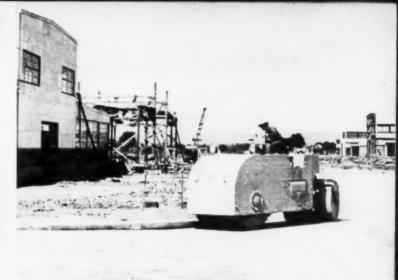
TO SAVE STEEL (below), no tie plates are used on creosoted ties of warehouse spur tracks, which will take little locomotive pounding. Track gang spikes rails to ties of this warehouse track alongside loading and unloading platform. Track will be raised by stone ballast to approximate elevation of platform, as this storehouse is one of 42 which have floors at ground level. Other warehouses have floors and platforms at freight car level.







GASOLINE-POWERED TRACK WRENCH is fitted with drill to cut holes in steel rails for splice plates. Nordberg track wrench travels on rails.



COVER STONE is rolled into first application of cold asphalt emulsion with Austin-Western 7-ton tandem roller, part of permanent depot equipment.

BUILDING 42 MI. OF RAILROAD TRACK and 1,000,000 sq. yd. of stone macadam pavement, the contractors for the Bureau of Yards and Docks of the Navy Department on a \$45,000,000 naval supply depot in the East facilitated their operations by use of power tools and power machines. Accompanying photographs show how power equipment saved labor and speeded construction on various phases of the work.

As a warehousing and distribution center for Navy supplies, the depot is situated on an important branch railroad just a few miles from the main line. Two lead tracks connect the railroad with the 42mi. rail system inside the 800-acre depot. Between the leaders, and parallel to the railroad outside the fence, are four 100car-capacity solid-train tracks. Beyond these tracks inside the depot is a classification yard of eleven large-capacity tracks served by two ladder tracks. Other tracks of the system provide service for all the permanent facilities dispersed over the depot area. For example, each of 55 large storehouses on the site is served by a railroad track on one side, with a

paved street for trucks on the other side.

For heavy trucking, the streets and roads on the project are paved with a three-course stone macadam 11 in. thick, consisting of two 4-in. courses and a 3-in. penetration top course. A heavy-duty wearing surface is built up on the pavement by four cold applications of asphalt emulsion totalling 2.55 gal. per sq. yd., with small stone and screenings rolled into the asphalt after each application.

Brann & Stuart, fixed-fee contractors, built the naval supply depot under the immediate supervision of Lt. Comdr. H. V. Martin (CEC) USN, officer in charge of construction for the Bureau of Yards and Docks. For the contractors, H. B. Madden was project manager, and Charles P. Hartline was general superintendent of utilities, railroads and paving.

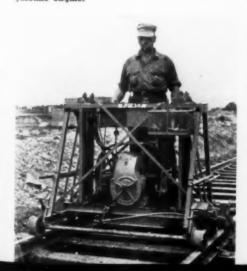


SECOND TYPE OF POWER JACK is Nordberg worm-gear unit powered by LeRoi four-cylinder gasoline engine. Jack columns bear against steel pad resting on bottom of ballast trench.



PERMANENT RACKS for lumber storage consist of timber stringers on concrete pedestals beside railroad track, part of 42 mi. installed by contractors for naval supply depot.

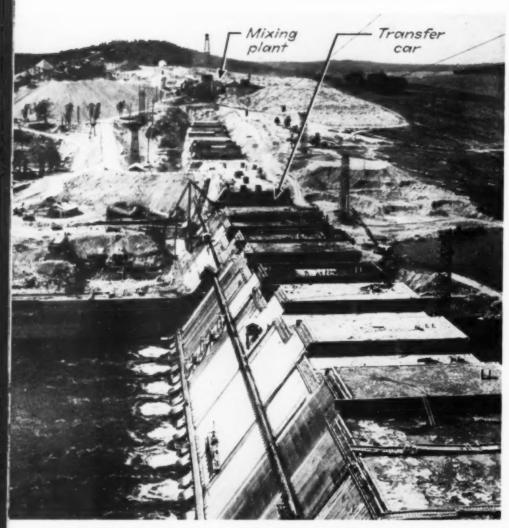
PRIOR TO STREET PAVING (below), truck mixer delivers concrete to wall bordering freight platform alongside storehouse. Gasoline-powered flexible-shaft vibrator consolidates concrete in wall form.





TWO TYPES OF POWER JACKS (below) are used to raise tracks for ballasting. This type is Nordberg hydraulic track jack, which lifts rails and attached ties by means of two hydraulic rams operated by oil pump driven by Briggs & Stratton one-cylinder gasoline engine.

## Truck Shuttle Service speeds Cableway



TRUCK SHUTTLE between mixing plant and transfer car on dam shortens cableway haul by 1.350 ft. for concrete going to monoliths of left half of structure, in foreground.

Page 62

TRANSFER DOCK (below) on Block 25 of dam is equipped with self-propelled hopper car which takes 4-yd, batches dumped from hauling units and delivers concrete into 6-yd, cableway buckets.

CONCRETE BATCH (below) hauled to transfer point from mixing plant is discharged by Dumptor into hopper car. Beyond car is control house for operators of two cableways.



BY CUTTING 1,350 FT. off the cableway haul of concrete going into the left half of Norfork Dam, 1.500,000 cu. yd. straight gravity structure 1/2 mi. long across the North Fork River in north-central Arkansas, a truck shuttle service operating between the mixing plant and a transfer hopper car on the dam increased the speed of concrete placement in the left portion by 50 percent and has stepped up overall concrete progress by 22 percent. The result has been to accelerate completion of the project by The Utah Construction Co. and Morrison-Knudsen Co., Inc., contractors for the U.S. Engineers, and to permit the generation of hydroelectric power early in 1944. Six 6-yd. Koehring diesel Dumptors transported 4-yd, batches of concrete from the mixing plant, located just below the head tower of twin cableways, to a self-propelled, electrically powered hopper car near the mid-point of the dam; this car moved transversely on a partially completed monolith to deliver concrete into the buckets of either of the two cableways. An accompanying chart shows how the truck shuttle speeded concrete placement after the service

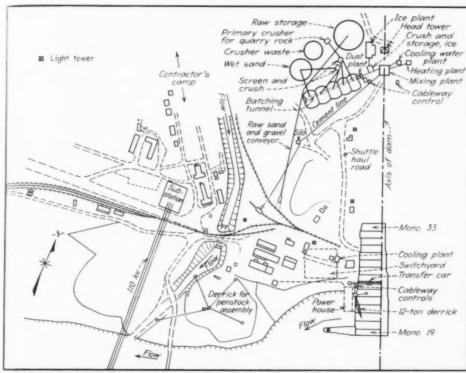
was inaugurated Aug. 6, 1942. Although designed primarily as a floodcontrol project, original plans under which contract construction began in April, 1941, made initial provision for future power development by including four 18-ft.-dia. penstocks in the dam. Within a few months after Pearl Harbor, it became apparent that power might be required soon to supply war industries in Arkansas and nearby Missouri. The contract was modified by a supplemental agreement to provide for expediting dam construction. and a separate contract was negotiated for installation of one generator unit, with a powerhouse and penstocks for two units. Octagonal openings have been

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## Handling Concrete for Norfork Dam



CONSTRUCTION LAYOUT on right bank of river Indicates position of mixing plant below head tower of twin cableways. Note truck shuttle haul road and transfer car on dam to deliver concrete into cableway buckets, shortening cableway haul into left half of dam.

formed in the dam for the eventual completion of the other two penstocks, but, to save steel, only the stub ends of the latter penstocks are now placed at the upper ends of the two openings. The agreement for expediting dam construction called for a speed-up in concrete placement to permit raising the water level at a faster rate.

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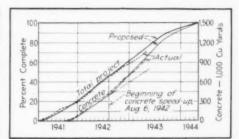
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About 400,000 cu. yd. of the total of 1,-

500,000 cu. yd. was already in place when the speed-up program went into effect. By virtue of the faster placement, the first 35,000-kw. unit will begin generation of electric power more than six months earlier than would have been possible under the original schedule.

Twin cableways serving the dam, which measures just 16 ft. short of ½ mi. in length, are among the longest on rec-



CONCRETE PLACEMENT in dam is accelerated by speed-up program involving use of truck shuttle and transfer car to deliver concrete to cableway buckets near mid-point of structure.



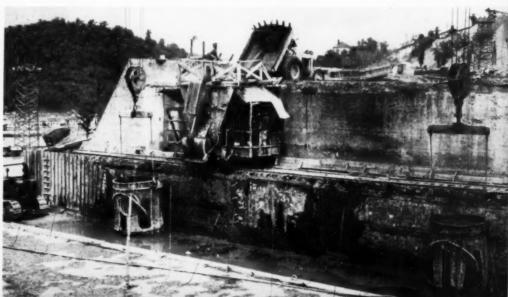
ENGINEERING AND CONSTRUCTION for contractors are supervised by J. H. REED (left), assistant project manager, here talking with JOHN R. BARRY, office engineer.

Page 63

JOB ORGANIZATION for contractors is headed by C. B. (Woody) WILLIAMS (below), project manager. veteran builder of concrete dams.

TWO CABLEWAY BUCKETS (below) are landed in loading dock on dam to be filled by transfer car, which has just received batch dumped by hauling unit. Armored cable supplying electric power to hopper car trails back and forth in board slot alongside con crete wall beside track.



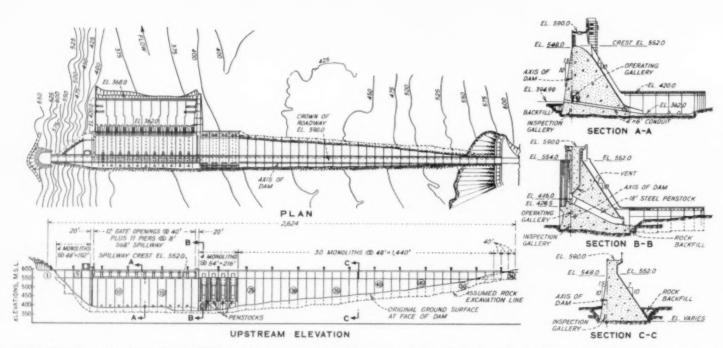




AT MIXING PLANT, two Dumptors run under discharge chutes to load 4-yd. concrete batches.

ord. Track ropes 23/4 in. in diameter, of American Steel & Wire Co., locked-coil construction, stretch 2,835 ft. from a common head tower 150 ft. high at the right extremity of the dam to two 100-ft. traveling tail towers on steel-rail tracks at higher elevation on top of the steep left abutment. Lidgerwood 250-hp. electric hoists wind the endless hauling ropes at a speed of 1,200 ft. per minute and raise the four-part hoisting falls at a rate of 300 ft. per minute. The endless rope is 1/8-in. Lang lay, and the load line is 3/4in. preformed regular lay, with independent wire-roper center. All types of hauling and hoisting wire rope were supplied by the John A. Roebling's Sons Co.

Average haul from the mixing plant into the left half of the dam is 1,850 ft. By cutting 1,350 ft. off this distance,



NORFORK DAM calls for placement of 1.500.000 cu., yd. of concrete in straight gravity structure nearly ½ ml. long. Dam comprises 56 monoliths, mostly of 48-ft. length. in which concrete is placed in 5-ft. lifts.

Page 64



HEAD TOWER (right) 150 ft. high at right extremity of dam supports twin cableways 2.835 ft. long stretching to traveling tail towers on top of left abutment in distance.

MOVABLE TAIL TOW-ERS (left) 100 ft. high for twin cableways travel on steel rail tracks through 250-ft. arc at left abutment.



round-trip travel of cableway buckets was reduced about 21/4 min.

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o. nt ft. Capacity of the mixing plant is about 60 batches per hr. When placing concrete in the near half of the dam, with an average haul of 800 ft. or less, the twin cableways are able to handle the maximum output of the mixing plant. For the longer haul to the farther half, cableway capacity was inadequate. By shortening the average haul to 500 ft. and speeding the charging of concrete buckets with a transfer car, concrete could be placed in this portion even faster than in the right half of the dam. Dumptors made the 2,700-ft.

round-trip cycle between the mixing plant and the transfer hopper, including loading and unloading time, well within the allowable 4 min. to take the full output of the mixers.

Dumptor construction was altered only slightly for concrete hauling. The contractors extended the sloped plate of the body about 18 in. to meet the sides at the top and rebalanced the hauling unit to take care of this extension of the body.

Three Koehring front-end charging tilting mixers produce the concrete at the mixing plant. Mixing time is 2½ min. per batch, as specified for a 4-yd. mixer. The

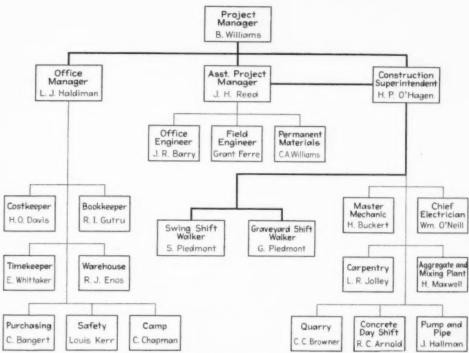
mixers dump into a central hopper feeding two discharge chutes, one for each cableway. Thus two buckets or two Dumptors can be spotted under the chutes at one time.

Numbering of the 56 monoliths in the dam is noted on an accompanying drawing. Dumptors traveled a haul road from the mixing plant to Block 30 and crossed the level top of five monoliths to the edge of Block 26. These monoliths were topped out temporarily at El. 480, about 110 ft. above their foundations and 110 ft. below their final elevation. Block 25 was com-

(Continued on page 134)



COSTS AND ACCIDENTS are kept in check by these two stalwarts, LEO J. HALDIMAN (left), office manager, and LOUIS KERR, safety engineer.



SUPERVISORY PERSONNEL under direction of B. (Woody) Williams, project manager, keeps job running smoothly for The Utah Construction Co. and Morrison-Knudsen Co., Inc., contractors for U. S. Engineers at Norfork Dam.

Page 65

CABLEWAY OPERATOR (below) in control house at loading point receives directions for spotting bucket by telephone from signalman posted on monolith that is being concreted.

ROLLER-GATE BUCKET (below) of 6yd. capacity, carrying 4-yd. batch, is discharged by workman hanging on lever yoke. SIGNALMAN (below) equipped with pushbutton and telephone apparatus gives directions to cableway operator in charge of lowering first bucket to start new 5-ft. lift in dam monolith.









ELEVATED CAB for operator of P&H crawler crane affords vantage point that speeds placement of inside forms in concrete ship hull at Belair. Calif., yard of Barrett & Hilp, San Francisco, contractors for 26 concrete barges. Reason for running exhaust pipe up above operator's cab? To keep operator from becoming "exhausted."

WITHOUT DISMANTLING STIFF-LEG DERRICK of 12-ton capacity originally erected to place pensiock sections in Norfork Dam. contractors remove large concrete pier (below) under one leg with dynamite blast to make way for powerhouse construction. After replacing bulky pier with steel column. The Utah Construction Co. and Morrison-Knudsen Co., Inc., contractors for U. S. Engineers, keep derrick in service to handle materials and equipment for powerhouse. During alteration, load on pier was reduced to zero by setting derrick boom parallel with stiff leg and tying load line to anchor on dam. sufficient tension being taken in line to balance load.



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# They Did It

## CONSTRUCTION DETAILS For Superintendents and Foremen



HALF A ROLLER SKATE carries load of heavy burner used in brazing big copper pipe. Method was one of "how to speed production" ideas submitted by RUSSELL BROWN in suggestion box of Kearny. N. J., shipyard of Federal Shipbuilding and Dry Dock Co.

U. S. STEEL NEW

CARRYING WATER AND LIQUID FUELS behind battle fronts in North Africa and Sicily, flexible, portable pipeline (below) is vital link in Army supply lines. Designed by SYDNEY S. SMITH (right), manager product pipeline department, Shell Oil Co., Inc., line has full automatic control so intermediate pumps are immediately shut down when flow is cut off at delivery end. Made of spirally welded steel, it weighs only 90 lb. per 20-ft. length and can be laid at rate of 10 to 30 ml. per day by unskilled or regular Army personnel. Gasoline-powered pumps are installed at 10-mi. intervals, and line can be operated with few trained men. Cost of material, not including transportation or labor, is about \$3,000 per mi.





PROTECTIVE GUNITE COATING is applied by American Pipe & Construction Co., over exterior coating of coal-tar enamel to complete reconditioning of 36-in, steel pipe for Metropolitan Water District of Southern California. Pipeline will form part of water distribution system extending from Santa Ana. Calif., to South Coast.



STABILIZED SAND-SHELL MIXTURE for runway shoulders on U. S. Engineer project at Gulf Coast air base is produced by Austin Road Co., Dallas, Tex., with 5,000-lb, pug-mill originally built in contractor's shop to turn out hot bituminous mixes at rate of about 100 tons per hour. Mixing stabilized batches containing about 3,700 lb. of oyster shell and 1,300 lb. of sand, mixer's hourly output is 100 to 120 tons. Pug-mill is belt-driven by 145-hp, diesel engine.

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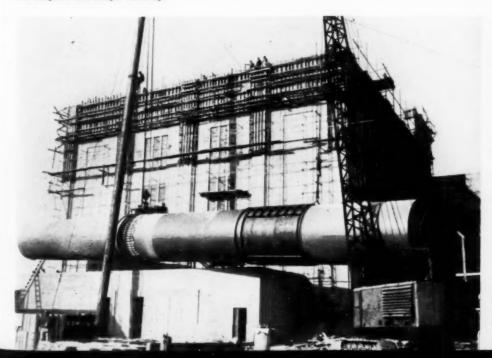
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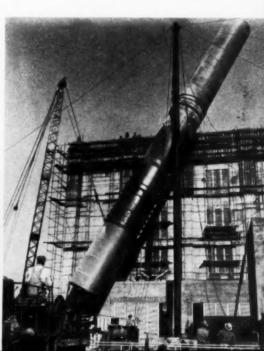


SIXTY-FOOT SECTION OF FALSEWORK, weighing about 24 tons, is moved by crane with 107-ft. boom from one hangar at Moffett Field to another. Box girders of 220-ft. span that surmount entrances to Navy's hangars for lighter-than-air craft, were built on falsework erected in sections and designed to be picked up and moved from one girder site to next. Unit sections of falsework were so useful on this and other jobs that they were patented by their inventor. J. H. Pomeroy, well-known West Coast contractor.

Page 67

HOISTING TEAMWORK by gin-pole and crawler crane (below) raises to place tall 35-ton steel stack for new Harbor Steam Plant of Los Angeles Bureau of Power and Light. Starting in horizontal position (left) stack is gradually up-ended (right) and seated on its base. Stack is just 23 ft. shorter than a Los Angeles limit-height building.



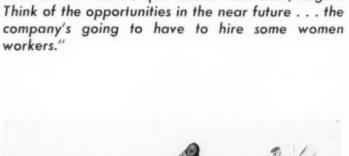








"You would land a contract like this! Why we'll be stuck here for years."



"You'd be a fool to quit tunnel work now, Regan.



"Passing the hat . . must be a benefit performance."

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ACROSS AFRICAN DESERT water pipeline aggregating 145 mi. in length is laid by sappers of Royal Engineers in 56 days. Project also included 7 pumping stations and 10 reservoirs.

### Water for Britain's Desert Army

#### Supplied in Combat Area by 145-Mi. Pipeline Built in 56 Days

By an Officer of Britain's Royal Corps of Engineers

FROM THE BEGINNING of the Egyptian and Libyan campaigns great stress was laid on the difficulties of getting adequate water supplies to forward troops. Water supply is largely a responsibility of Britain's Royal Engineers, and magnificent work has been done by sappers in Egypt.

At the beginning of September, 1941, there was no continuous water pipeline forward of El Daba, over 80 mi. west of Alexandria. There existed a small local supply at Mersa Matruh, more than another 80 mi. further west, but this only partially supplied the needs of the garrison. Vast supplies for the forward troops had to be brought up daily by rail and sea and kept in local reservoirs near Matruh. All requirements forward of

Matruh had to be supplied by water trucks filled from the Matruh reservoirs.

Britain's forward troops were at this time in the neighborhood of the Libyan frontier, preparing for the advance which linked them up with Tobruk garrison and drove the Axis armies for the second time back to El Agheila on the gulf of Sirte.

(Continued on page 148)

Page 69

WELL DRILL RIG (below) is operated at desert location by Royal Engineers of British Eighth Army. Heavy drilling stem and bit are suspended from derrick, as bailer is lowered to remove material from hole.

HEAVY DRILL STEM AND BIT (below) are raised out of deep well-hole in desert by British sappers operating wheel-mounted drill rig, as work proceeds on water pipeline.









4.000 FAMILY UNITS for shippard workers are provided in 285 apartment buildings like these three. At left is one of 74 utility buildings centrally located for each four apartment buildings.

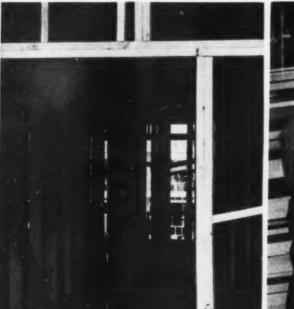
## Time-Saving Methods and Equipment

Speed Huge Mass Housing Project of 4,000 Apartment Units in 285 Buildings for Shipyard Workers



JOB-MADE "ESCALATOR" saves time and labor. Ford engine on truck drives pair of belts on which wood blocks carry lumber to second floor or roof. With this rig and four loaders 5,000 b.ft. per hr. can be dumped.

BOILERS FOR HOT WATER STORAGE (below) are slung from second floor joists to save space in central heating plant. ALL DOORS for 4,000-unit project (below) come from mill fitted into frames with hinges and locks in place, thus effecting great time saving on job.





"OPERATE ON A LARGER SCALE and build faster than ever before" were the orders between the lines in a contract recently awarded by the U.S. Maritime Commission to provide 4,000 apartmentunits for workers in the Permanente Metals Corp. shipyards (a Henry J. Kaiser enterprise) at Richmond, Calif. The contract, the largest of its kind ever awarded to one firm for apartment-units in this country, went to Robert McCarthy, San Francisco contractor, who has previously made several construction speed records on mass housing projects. On this job the order was for 285 buildings, each laid out for 14 apartments-a larger number of units per building than in previous jobs. There were also 74 separate utility structures (one for each group of four apartment buildings), streets, sidewalks. sewers, utilities, etc., which brought the project as a whole into the \$6,000,000

On this job the McCarthy organization

Page 70 - CONSTRUCTION METHODS - October

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PIPES, bundle



FROWN LINCLEUM, which looks black in the picture, is cemented over backer board, avoiding use of t.&g. flooring, now critical material.



BACKER BOARD heavy asphalt impregnated paper made by Celotex, is nailed on top of flooring consisting of rough 1x8s. Note automatic hammer.

had the benefit of much previous experience with mass housing, plus an unusual opportunity for quantity production because the 4,000 apartment-units are identical. Finally, there was the McCarthy prefabrication mill, only 20 mi. away, described in Construction Methods for September, 1942, p. 48, from which could be trucked, ready for assembly in the buildings, all millwork items. The outcome of this favorable combination was greater speed and lower costs than has been achieved before.

Starting only 55 calendar days after work was actually under way, some houses were turned over for occupancy every day and as this is being written the prospect is that the last of the 4,000-apartment units will be made available in less than 4 months from actual start of the work. This is a month ahead of the delivery time required by contract.

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Finally, these apartment units will cost less than \$1,500 each, including land, streets and utilities. This is a record low for cost in apartment units of this type.

Contributing to the low cost are the economical planning and the time-saving methods and equipment illustrated in the accompanying pictures. Walls, inside and out, were covered with gypsum board. On the interior walls it was simply nailed up in 4x8-ft. sheets and painted. No wood or metal lath, no plastering and a minimum of critical materials inside and outside.

Subfloors of rough 1-in. boards were covered with asphalt-impregnated paper ½ in. thick, cemented down. Over this went an all-brown Armorfloor (Armstrong Cork Co.), giving an extremely low cost and a very durable floor.

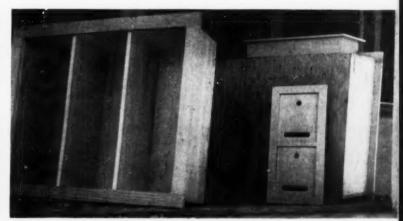
In contrast with the usual custom of setting up a large centrally located mill



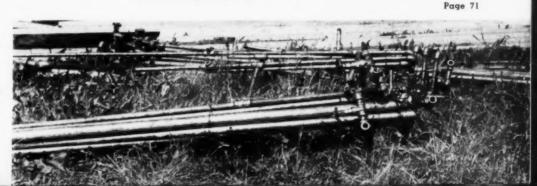
MILL-CUT MATERIALS are delivered to each building in bundles.



INSTEAD OF METAL GUTTERS, using critical material, gutters made of redwood are delivered to job already painted.

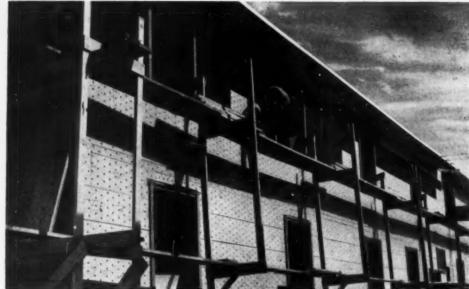


CABINETS AND MAIL BOX arrive from mill ready for installation, and complete to last piece of trim.



PIPES, CUT TO EXACT LENGTH (right), arrive in bundles at each building with fittings already attached.





OVER TAR PAPER, fireproof gypsum (gripslath) is nailed on exterior walls. Then a stucco finish is put on, thus saving critical materials.



CEMENT SHOWER TRAYS are made with wire reinforcing.

divisions into which the spread of the project naturally divided the work. The contractor's organization, correspondingly, was set up in four entirely separate divisions, A, B, C and D, each operating under a superintendent reporting to Ted Johanns, general superintendent, or Ed Manning, his chief assistant. Each division had separate offices, separate field forces, time-keepers, and even its own transportation equipment.

However, there were centralized means

for a job of this size, four separate mills were established, one in each of the four

However, there were centralized means of control for incoming materials. All lumber came in on one spur track, all wallboard on another spur and miscellaneous materials on still another. As each kind of material arrived, it was stockpiled on carrier blocks and was then allotted, on requisition, to each of the four divisions. Distribution of each material from one central point insured

equitable distribution. Surplus miscellaneous items went to a central warehouse (under control of a head warehouseman) and this supply served as a reservoir that avoided work stoppages when material deliveries were delayed.

From the mill were trucked bathroom cabinets, kitchen shelves, all trim, cut to length, and even doors fitted with hardware and mounted in their frames. All prefabricated mill work came to each building in three large truck loads, complete to the last piece of trim.

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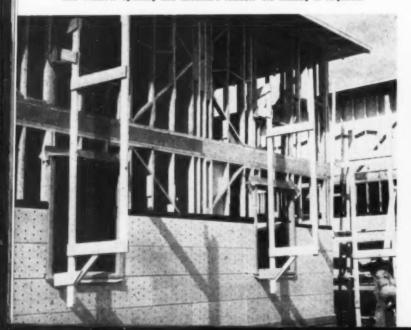
A notable time saver was the job-made escalator, illustrated herewith, which could be set to hoist at any angle and which delivered lumber to second floor or roof, dumping it at convenient locations. With this simple rig four men could put lumber "upstairs" at a rate that would have required twelve men without this time saver.

Typical of the many little items that

Page 72

NOVEL. PORTABLE FRAMES (below) support planks on which workmen finish outside walls. Devised by McCarthy organization, frame is hooked into window opening like fireman's ladder. No nailing is required.

JIGS ARE USED (below) for assembling precut gypsum board. It then is nailed and glued together into panels eliminating use of wood and metal lath and plastering for walls.







GYPSUM BOARD, cut with circular saw, is stockpiled ready for assembly into warm air heating ducts.



EAVES ARE SPRAY-PAINTED before outside walls are finished to save time required for protecting completed walls.

were figured out to save time and cost was the use of a piece of paper put over the mirror in the bathroom cabinets when the glass was put in at the mill. After all painting was done the paper was cut away, thus saving the need for scraping paint from the glass. This little time saver totaled a \$400 saving for the 4,000 units.

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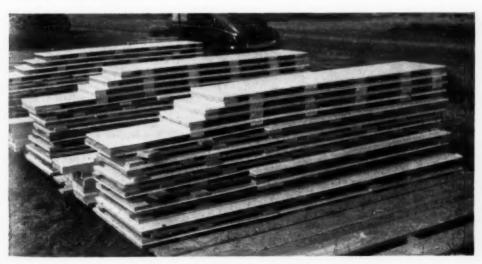
The lumber for this project constituted a record-breaking order even for Portland, Ore., the lumber center of the West Coast. To spread out the burden, the order was distributed among 67 lumber mills, all clearing through a lumber coordinator at Portland operating in connection with U. S. Government auctions. The lumber order totaled 20,000,000 b.ft. (some 700 carloads). There were also 200 carloads or about 10,000,000 b.ft. of plaster board. In all, the project required delivery of some 1,800 carloads of freight in addition to what came in by truck.



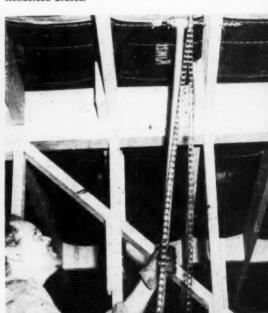
SOUNDPROOF KIMSUL is laid between floors before upstairs flooring is nailed down.

PANELS FOR DUCTS in each building are stockpiled together awaiting delivery. One department turned out all ducts for 4.000 apartment units, Materials were alloted on requisition to each of four divisions into which work was divided.

BORING HOLES FOR ELECTRIC WIRING (below) in inaccessible places is speeded by chain-drive Henderson braces.



October 1943 - CONSTRUCTION METHODS - Page 73





JUST WHAT PART will the construction industry play in the post-war public works program, and can construction organizations be reasonably employed after the war? This question is sure to be heard whenever and wherever contractors and others allied to the industry gather these days. The answer, in my judgment, rests to a very large extent with the industry itself, and when I use the word "industry" I mean engineers, contractors, equipment manufacturers, material dealers and all others allied to the construction industry. It also depends upon the action taken by Governmental officials in every state, county and city in the Union. It also depends upon cooperation and support of the various labor organizations that are usually employed in the various classifications.

If these agencies do not immediately get together in an organized effort to have contracts, plans and specifications prepared and ready so that thousands upon thousands of jobs may be immediately available and waiting at the precise moment that the war ends, then the alternative, which God forbid, is that we may well expect some new alphabetical organization to be set up in Washington to dole out huge sums to provide subsistence for returning service men and for those millions who will be released from the various war industries throughout the country. As we know from our past experience, this doling out of subsistence money does not maintain contractors' organizations, nor enhance contractors' financial balance sheets.

#### By ARTHUR A. JOHNSON

Chairman, Post-War Public Works Program Committee of General Contractors Association of New York and President, Arthur A. Johnson Corp.. Engineers and Contractors.

Robert Moses, New York City Park Commissioner and nationally known city planner extraordinary, in commenting on the dole in a recent magazine article, has this to say:

"Keep in mind that a straight dole is the most expensive of all luxuries, the least productive and the most debilitating. As applied to honorably discharged fighting men, it means despair and something like revolution."

 Mr. Johnson's recital of what has been done in New York to produce realistic plans for post-war construction should stimulate similar activity in other states. Here is opportunity for local engineering and construction organizations to exert their influence in bringing essential post-war projects into the BLUE-PRINT, NOT THE BLUE-SKY, stage.

The State and City of New York have taken the lead in being prepared to have ready thousands of jobs when the present conflict ends. Many months ago the City of New York allocated \$25,000,000 for the purpose of preparing and having ready plans, contracts and specifications of essential public works projects amounting to approximately \$750,000,000, designed to give gainful employment to more than 200,000 men at the site. Add to this the number of people employed off the site, in mine, mill, fabrication plants, railroads, etc., and you will find that considerably more than a million persons can be employed in the carrying out of this program.

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#### Post-War Planning Committee Appointed

The State of New York has authorized, appropriations have been made, and Governor Thomas E. Dewey has already appointed the necessary Post-War Planning Committee not only to plan state improvements, but to pay half the cost of post-war design of local projects sponsored by municipalities. It is believed that these projects of the state will aggregate \$600,000,000, so that the joint effort of New York City and New York State will aggregate well over \$1,350.-000,000

These projects are not boundoggling schemes to provide jobs. They are projects which are essential and which will be built in the ordinary course of normal development, or which have been deferred on account of the war. The cit

and state, by taking vigorous action now, have wisely pre-dated that time so that jobs will be ready when they are most required. The City's post-war program includes street, sewer, rapid transit, repairing, modernizing and expanding hospitals and other institutions, housing, markets, school, library, fire, police, health, sport, port and air terminals. Real progress has been made with plans, contracts and specifications, and the work is being rushed with all possible speed.

#### Detailed Analysis of Projects

As contractors, we are proud of the fact that the General Contractors Association and the Building Trades Employers Association, both of New York, have cooperated with Commissioner Robert Moses and the City Planning Commission in breaking down these projects and, at considerable expense, have produced and furnished data as to the number of manhours, administration, material and equipment required for each of these projects. The availability of this information is obviously highly essential, as it provides the basic industries with a bill of material to look forward to.

In citing the work done by these two contractor organizations I do so as a respectful reminder to other contractor groups throughout the country of the manner in which they may be of vital assistance in connection with their respective state and city programs.

At the recent Conference of Governors held last June in Columbus, Ohio, the subject of post-war public works programs came in for very serious consideration. It was practically the unanimous opinion of that conference, which, curiously enough, is evenly divided with 24 Republican and 24 Democratic governors, that such state post-war construction programs should be under the direct control of the states rather than some Federal agency. Strong emphasis was placed upon the necessity for preserving and encouraging private enterprise.

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#### All States Should Prepare

While a large number of the states have already appointed post-war public works program committees, there still remain a number of states that are lagging in this respect and it is in these states that the efforts of the local contractor groups can be most effective in contacting the proper officials and selling the idea of their state keeping up with the others and thus being prepared to take care of those for whom jobs must be provided when hostilities cease. With practically all of the governors of the various states apparently in accord with this viewpoint, the work of such contractor groups should be comparatively easy.

The one point that I can not too strongly emphasize is that unless all the states are prepared with completed programs of essential projects, in the blueprint

ARTHUR A. JOHNSON, author of the accompanying article, was selected by the General Contractors Association of New York, of which he is a past-president, to head its recently organized Post-War Public Works Program Committee. In addition to his responsibilities as president of the Arthur A. Johnson Corp. of Long Island City, New York, which has executed such important war contracts as the Bermuda Army Air Base and the Letterkenny Arsenal in Pennsylvania, Mr. Johnson served recently as a director of the Metropolitan Section, American Society of Civil Engineers, and is vice-president of The Moles, New York organization of tunnel and heavy construction men.



stage, those in Washington who favor a federal-controlled program will be in a stronger position to sell their idea to the Congress. From past experience I need not say just what this would mean to the construction industry.

As Commissioner Robert Moses so vividly points out:

"If every state and municipality will follow the example of New York and plan similar public works *now* and get specifications ready, the whole nation will have taken out first insurance against unemployment."

To emphasize the advisability and necessity of states and municipalities preparing plans and specifications now, so that jobs can be provided when they are most required, I quote from a recent statement of President Roosevelt:

"I hope that other cities and states will follow New York's example, and to encourage them I have recommended to the Congress on several occasions, beginning as early as the spring of 1941, that federal aid ought to be provided for such detailed plan preparation."

#### Combined Effort Essential

In every field of business activity, and particularly among contractors, we still have the rugged-individualist who is the first to complain vehemently about the complex orders, regulations and trouble-making decisions emanating from governmental agencies in Washington and directly affecting him. Nevertheless, he is the last to join with others in his field to obtain relief or a reasonable interpretation of such orders and regulations. He is the type—and unfortunately we have many of them—who is the first to "grouse," and then sit idly by, lulled into

a state of security in the feeling that such effort, in which he should be participating, will be taken care of by others without any contribution whatever on his part. To paraphrase the old expression, "In union there is strength," I strongly believe that there never was a time in all the history of business that the combined efforts of all of us are so essential if we are to preserve and maintain the American way of life and our system of free enterprise, which have done so much to make this country what it is. Certainly there never was a time when it is so essential that we combine our organized efforts to bring about a fruitful construction program after the war. It is equally certain, if we do not use our combined efforts, that the highly trained and experienced contractor organizations will run the very grave risk of becoming just regretful memories.

#### Speed in Planning Necessary

The marvelous contribution to the war effort that has been made by the construction industry is too well known to the readers of Construction Methods to warrant further mention by me, and all those associated with the industry may well feel proud of that record. I would be the last to suggest any activity that would in the least interfere with the prosecution of the war effort until final victory has been won. Nevertheless, I strongly believe that the preparation of plans and specifications by every state in the Union for a post-war construction program is essential to the future welfare of the country, and it is my judgment that such programs can and should be concluded with all possible speed and without interfering in the slightest degree with our war efforts.



## For the Roads of the future

While you are laying your plans for an improved system of highways after the war and are figuring out the details to build them...the construction equipment industry, now working for Victory, is also planning for Peace — that you may be able to build better roads at lower cost. Many of the new materials, now being developed, will be used to the fullest extent in new machines—giving you greater strength, less upkeep.

New methods of manufacture will provide a bigger dollar-for-dollar value. Experiences of war — toughest testing ground for any machinery—will be turned to your advantage in better overall construction. You will have a more complete line of equipment to choose from — units that will more closely fit your requirements. Earth will be moved faster than ever before...with greater economy.

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## and the Tools to build them

All these things will not happen the day the war ends. It will take time to change over from "all-out" war production—to thoroughly test new models, retool plants and assemble materials. But the job will be hurried...as fast as practically possible. Allis-Chalmers research engineers,

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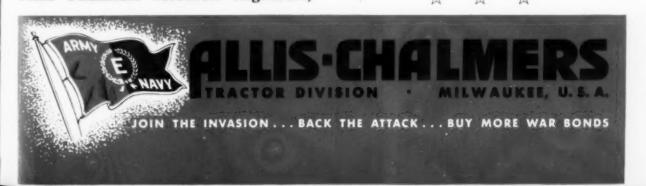
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reved eatalways alert to new trends and developments, have their ears to the ground and their eyes on the future, to provide you with the best equipment available . . . that your construction program may go forward in full stride.





# Plood Fighting BY EMPLOYEES PROTECTS PLANTS OF EQUIPMENT MAKERS

TRACTORS BUILD DAM across drainage ditch in back of levee to build up counter-pressure.

RISING TO A PEAK OF 28.82 FT. early last summer, the Illinois River called forth the full resources of the Caterpillar Tractor Co. and R. G. LeTourneau, Inc., to keep the flood waters out of their Peoria, Ill., factories. War production was temporarily halted as men and equipment worked day and night to hold back the river, which topped by more than 2 ft. the 99-yr. record of 26.3 ft. established in 1844.

Caterpillar's 13,500 employees, working in 12-hr. shifts

IN ENDLESS PROCESSION (below). Caterpillar employees carry and stack sandbags as river laps at top of levee near plant.



when the flood was at its height, placed 1,500,000 sand bags and 800 carloads of sand. First line of defense was the river levee and railroad embankment. All openings around the plant were also sandbagged as protection in case the levee broke. Inside the building, records, desks and machines were piled high.

Fighting the flood at the LeTourneau plant took 7,907 tons of sand and more than 200,000 sacks, plus 45 pumps and tarpaulin. At the height of the flood, about 85,000 sq. ft. of the company's 1,298,249 sq. ft. of plant area were completely under water. Around the No. 1 plant was built almost a mile of sandbag barricade, varying in thickness from 3 to 15 ft. and in height from 2 to 9 ft. Behind this wall of 200,000 sandbags were 45 pumps and a fighting force of several hundred men. The plant was kept so free from equipment damage and accompanying silt that equipment fabrication could be resumed as soon as the water subsided below the danger stage.



DELIVERY OF SAND BAGS to restrain rising water is speeded by use of trailer hauled by powerful Tournapull,

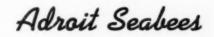
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BEHIND SANDBAG BARRICADE (below). LeTourneau workers man pumps as water seeps past levee.





METAL GASOLINE DRUMS are slit and then flattened with a road roller by Seabees on an unidentified South Sea Island. The salvaged metal will be used in many ways. Pile of already flattened drums lies in right foreground.



## Fashion Roofs, Pipelines, Docks From Gasoline Drums

BUILDING AN ADVANCE BASE in the South Pacific demands ingenious use of materials at hand. The Navy's Construction Battalions make airfield runways with lava from volcanoes, crush coral dug from the sea and use it for paving, use soft drink bottles as insulators for power-line extension and revamp blasted enemy equipment into dragline buckets. Metal gasoline drums furnish the latest examples of Seabee inventiveness.

Skilled craftsmen between the ages of 17 and 50 can now volunteer for service in the Seabees. Salaries range from \$54 to \$126 a month plus 20 percent for overseas duty, and include quarters, food, clothing, transportation, medical and dental care, and other incidentals to which enlisted personnel are entitled. There are also allowances for dependents. Full information may be obtained at any Navy Recruiting Station.

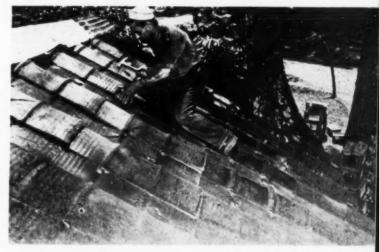
METAL FACING (below) for bulkhead at dock is obtained by flattening drums into sheets, as Seabees construct island bases.





SEABEES MAKE PIPELINE with empty drums from which heads have been cut.

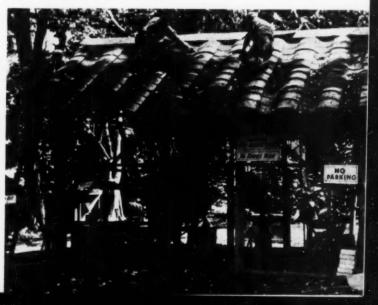
OFFICIAL NAVY PHOTOS



IN SPANISH TILE FASHION. Seabees use segments of flattened drums for roofing shops and storehouses

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SHOP ROOF (below) is constructed from flattened gasoline drums, in line with Seabee policy of wasting nothing.



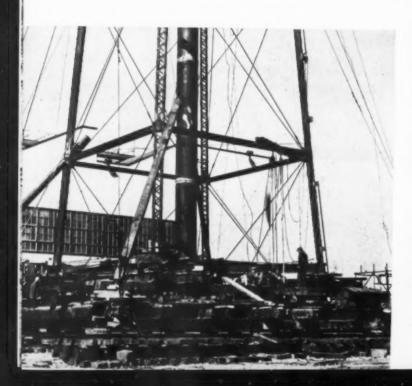


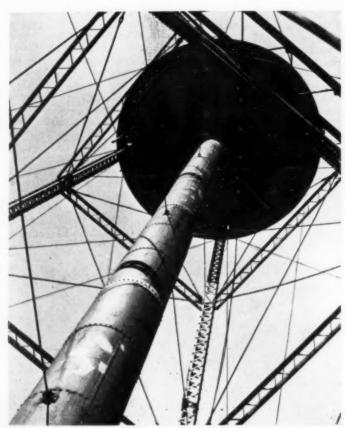
MOVING A 50,000-GAL. riveted steel water tank in one piece was a major problem tackled by The Austin Co. in building a huge timber factory for the U. S. Army Engineers at a plant where the Douglas Aircraft Co., Inc., is now producing C-54 Sky Masters. Relocation of the tank after it had been completely assembled on a 100-ft. base was necessary to make way for a substantial plant addition not contemplated when the buildings were laid out.

The moving was accomplished over a period of 28 days, during which the tank was jacked up by means of timber cribbing, moved a distance of 266 ft., and permanently secured to new foundations. The structural steel base measured 40x40 ft. and the entire unit weighed 40 tons. Three parallel tracks extending from the original site to the new location were installed and served as ways over which the structure was moved at an average rate of 175 ft. per day by a single team of horses working one 8-hr. shift.

Moving was accomplished without developing a single leak in the tank, in spite of extremely windy weather, including one 40-m.p.h. gale. Albert J. Crowe & Son, of Chicago, handled the work. The tank had been erected originally in 1926 by the Chicago Bridge & Iron Co. for A. P. Green at Mexico, Mo. Later it was moved to Kankakee, Ill., but before erection there it was transferred to the Douglas plant.

# Moved 266 At. BY HORSE TEAM WITHOUT SPRINGING LEAK





TIMBER CRIBBING (left) is placed under four legs and standpipe of 40ton steel water tower preparatory to moving it to new location.

NO LEAK IS SPRUNG in 50.000-gal. second-hand water tank as it moves more than 250 ft., pulled by team of horses.

## Present and Accounted For... A PAGE OF PERSONALITIES



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COMPLETING 1.228-FT. BRIDGE across Obey River in Tennessee is construction crew of Morrison-Knudsen Co., Inc., of Boise, Idaho, headed by (left to right) A. M. CROXSON, superintendent; R. D. BAKER, assistant superintendent; O. E. LOONEY, concrete foreman; M. R. BURDEN, carpenter foreman; G. E. EWING, master mechanic, and H. H. JOHNSON, general swing foreman.



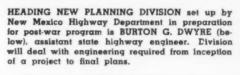
CHAIRMAN OF BUILDING AND INDUSTRY SEC-TION. Commerce and Industry Division of New York War Finance Committee is PERCY VERMILYA. President of Vermilya-Brown Co., Inc. Backing Third War Loan Drive, this section includes building contractors, building materials, engineers, general contractors, lumber, plastering, and painting.



NEARING CLOSE OF CONSTRUCTION on \$80,000,000 program for Bureau of Yards and Docks of Navy Department at Naval Air Station on Gulf Coast, three contractors' supervisors hold one of their many quick conferences. Left to right are: S. H. WILDE, general manager; C. A. SCHWOPE, general superintendent of engineering construction: and L. W. BOYD, general superintendent of building construction. Member firms in contractor combination are Brown & Root. Inc., Austin and Houston, Tex.; W. S. Bellows Construction Co., Houston; and Columbia Construction Co., Oakland, Calif.



NEW PRESIDENT of Walter Kidde Constructors, Inc., industrial engineers and builders. New York, is WILLIAM COLLINS, formerly vice president, who became head of organization following death of Mr. Kidde.





NAVY CONTRACT for two big timber blimp hangars is held by Earl W. Heple and J. H. Pomeroy & Co... Inc., joint contractors. Studying plans (left) are. left to right. C. H. (TEX) MANNING, contractors general superintendent; J. R. MACDONALD, general erection superintendent; and T. M. FISK, representing Timber Structures, Inc., which supplied and preframed more than 3,000,000 b. ft. of timber for hangar in background.



Page 81



for busy engineers.

The jet black markings stand out against the satin chrome finish, can be read easily even in poor or artificial light. The surface won't rust, crack, chip or peel. Flexible, sturdy 1/4" line. Tough genuine leather case gives extra wear.

Chrome Clad "Ranger"

Steel Tape is an ideal tape

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# CONSTRUCTION EQUIPMENT NEWS

OCTOBER, 1943, REVIEW of Construction Machinery and Materials



CRUSHING AND WASHING PLANT gids in production of suitable aggregate for paving runv and concrete construction at air bases. No. 455 is designed to be semi-portable, with main units mounted on heavy skids for easy movement into position on foundations. Conveyors are all-steel frames, made up of welded side frames and bolted knock down construction. Diesel power units provide ample economical power at any location. Steel bolted bins which are easily set up support screening and washing equipment. Consists of 40-in.x10-ft. traveling grizzly feeder which bypasses fines and controls feed to 30x42-in, primary jaw crusher. Super-service belt conveyor conveys aggregate to 48-in.x16-ft. vibrating screen. Material is washed and sand and water pass into paddle type dehydrator. Four steel storage bins receive finished aggregates. Oversize is discharged from top deck of screen to 54x24-in. roll crusher. Final crushing is performed in 40x22-in. roll crusher. If no sand is available, "stone sand" can be produced in final roll crusher. Entire plant is anti-friction bearing equipped.—Pioneer Engineering Works, Inc., 1515 Central Ave., Minneapolis, Minn.



CABLE CLAMPS for exposed industrial wiring have been developed to provide suitable support for branch feeders from main distribution system. Flexibility of arrangement and mounting is especially desirable for mass machinery installations in war plants. Quarter-bend clamp provides proper bending radius without injury to cable. Mooring clamp is used to anchor cable at supply and output ends without undue strain on cable line. Made from unbreakable malleable iron. Sweep of quarter-bend clamp is of sufficient length to make proper bend in cable sizes for which clamps are designed.—Appleton Electric Co., 1701 Wellington Ave., Chicago, Ill.



# Paster CONTINUOUS Pumping under all conditions

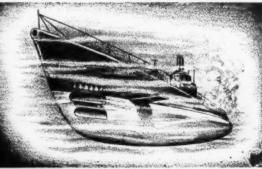
Contractors standardizing on Gorman-Rupp Pumps are getting extra hours instead of costly shut-downs due to pump failures. There's a DEFINITE REASON. More dependable. No priming jet to clog. No control valve to jam. This is important today when every piece of equipment has to take a beating. Let your distributor show you why more contractors are switching to Gorman-Rupp's every day.

Distributors in more than 100 principal cities.

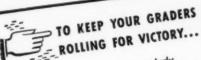
THE GORMAN-RUPP CO., MANSFIELD, OHIO

GORMAN-RUPP Self-Priming Centrifugal Pumps

# Balanced WEIGHT DISTRIBUTION







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- elements every 100 hours of use. ↓ Lubricate all parts of grader regularly. ✓ Service air cleaner every 10 hours of use.
- ✓ Clean fuel oil filters at least every 60
- √ Don't ride clutch. Adjust clutch pedal when and as needed.
- √ Keep electrical system in good condition -check battery regularly.
- ✓ Keep lost motion out of grader—use adjustments for wear and replace parts
- ✓ Keep tires inflated to recommended pres-
- If you need belp or advice on any of the ve, see your local Adams distributor.

THE QUICK DIVING and surfacing maneuvers required of submarines call for carefully planned balance of weight distribution! . Equally important to the efficiency of an Adams Motor Grader is its built-in balanced weight distribution—the product of careful and intelligent engineering . . . Adams balance gives enough weight on the rear wheels to provide traction that will utilize all the engine's power plus ample weight on the front wheels to hold them in line against skidding. Also sufficient pressure can be exerted on both blade and scarifier to cut any material a motor grader can handle . . . Balanced weight distribution is but one of the many Adams features you will like when once again you are permitted to buy equipment for use on peace-time projects!

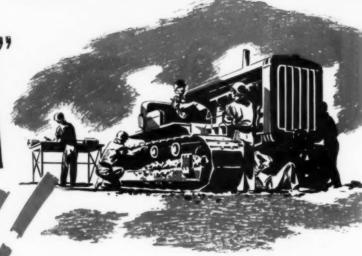
#### J. D. ADAMS COMPANY . INDIANAPOLIS, INDIANA

Adams motor graders, leaning wheel graders, elevating graders, bauling scrapers, tamping rollers, balldozers and road maintainers are used by allied forces throughout the world.

ROAD-BUILDING AND

EARTH-MOVING EQUIPMENT

# "CATERPILLAR"





# THE "FIGHTING FOUR"

These four things are essential in keeping your "Caterpillar" Diesels in fighting trim:

INSPECTION-Check up frequently. For expert inspection of operating parts, call in a trained "Caterpillar" service man. Read the Operator's Instruction Book.

LUBRICATION-Use the right quantity of the right oil at the right time in the right place. Keep it clean and replace it before it deteriorates, Read the Operator's Instruction Book.

ADJUSTMENT-Tighten all bolts. Keep fan belt and tracks at proper tension. Read the Operator's Instruction Book. For adjusting fuel injection valves, etc., call on your service dealer.

REPLACEMENT-Have your "Caterpillar" dealer replace, repair or build up worn bearings, track rollers, pins and bushings, sprockets, cylinder liners and other parts, saving time, money and

BECAUSE nearly every branch of the U. S. Army now uses "Caterpillar" Diesel equipment, thousands of soldiers are receiving thorough training in its care and maintenance.

Plenty of men in uniform had that training before they joined the colors, for over 4000 "Caterpillar" employees are now in the armed forces - including the men of the 497th Heavy Shop Company, enlisted direct from the ranks of "Caterpillar" workers.

More than 1500 picked soldiers from the Army Corps of Engineers have already been given a five-week

intensive course in Diesel maintenance and repair at the "Caterpillar" plant. Following their training, many of these Engineer troops go to the front with portable, truck-mounted workshops. They accompany combat forces into action and keep the machinery going.

In addition, school trucks have visited scores of Army camps, giving thousands of men on-the-spot instruction in the care and servicing of all types of "Caterpillar" Diesel equipment.

At the same time, many Army and Government owned "Caterpillar"

Diesels are being serviced and repaired in the shops of "Caterpillar" dealers located in all parts of the United States and Allied countries. Their skill and specialized equipment are keeping "Caterpillar" Diesels of all ages at work for victory.

Your "Caterpillar" service dealer is ready at all times to give you sound and friendly counsel. He will advise you on how to get a new machine if you are qualified to obtain one. And he will show you how to get more work and longer life out of your present equipment. Talk to him.

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portion of material to violent zigzag rolling movement which releases entrained non-magnetic particles which drop back on to feeder belt and move along to final delivery. Since separating belt runs faster than feeder belt, magnetic material spreads out over greater area and impurities or non-magnetic particles are sifted out, dropping on to feeder belt. Partially inclosed in welded steel housing for purpose of excluding foreign materials from entering separation process, it can be furnished in various sizes and belt widths.—

Stearns Magnetic Mfg. Co., Milwaukee. Wis.



INEXPENSIVE FIRE EXTINGUISHER CONTAINER reveals any attempt to tamper with extinguishers. Constructed of non-critical tough cardboard stock. Keeps extinguisher from reach of unauthorized persons but allows instant removal for legitimate use. Precise information on front of each Tampless Case shows classes of fire on which extinguishers should be used and those on which they should not be used. Instructions also tell how they should be operated. — American-LaFrance-Foamite Corp., El-



TAILGATE LOADER makes it possible for one man to load or unload from platform or van bodies materials that otherwise would require several men to handle. Device is hydraulically operated and raising, lowering, or holding at any elevation is accomplished with only one lever. Entire mecha-



nism locks up to body when in raised position. Wooden, steel reinforced tailgate may be used conventionally without operating lift. Powerful 5-in. hydraulic cylinder stops automatically at ground and body level and is capable of lifting from 750 to 1,500 lb. Mechanism complete with all fittings weighs only 670 lb.—Anthony Co., Streator, Ill.

#### An Important Message to

### Technical Men

The war has carried the manufacturing age to a new peak! Production demands have created technical problems the like of which the world has never seen before! The services of engineers are at a premium. Especially the services of one particular class—executive engineers—engineers with business training; engineers who can "run the show."

In these critical times, the nation needs engineers of executive ability now, today—not five, or ten years from now! The shortage of such men is acute—even more acute than that of skilled production workers. And company heads, aware of this situation, are offering high rewards to engineers who have the necessary training in industrial management.

#### Golden Opportunity for Engineers

In this new era, the engineer with vision and foresight has a golden opportunity. He will realize that out of today's tremendous production battles will emerge technical men who not only will play a major role in winning the war, but who also will be firmly entrenched in key executive positions when peace comes.

However, before the engineer can take over executive responsibilities, he must acquire knowledge of the other divisions of business—of marketing, accounting and finance. He has of necessity a vast amount of technical training and experience. But in order to grasp the opportunities that present themselves today—to assume leadership on the production front—he must also have an understanding of practical business principles and methods.

The Alexander Hamilton Institute's intensive executive training can give you this essential business training to supplement your technical skill.

#### FREE help for engineers

Ever since the war began, there has been an unusually heavy demand on the part of our technically-trained subscribers for the Institute's special guide on "How to Prepare an Engineering Report". Extra copies of this practical, helpful 72-page Guide are now available and, for a limited time only, will be sent free to all technical men who use the coupon at the right.



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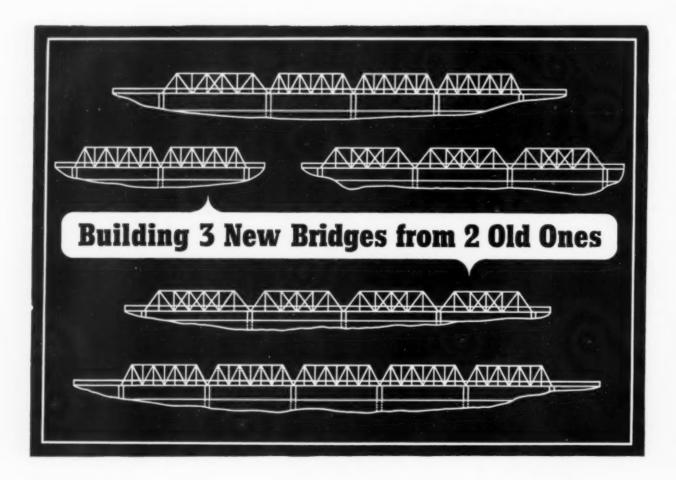
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The Army needed quickly three steel railroad bridges to connect two parts of a Tennessee ordnance plant split by three channels of a wide, shallow river. Because new steel was not immediately available, the Army decided to build the bridges from parts of two very old, abandoned bridges.

Bethlehem's job consisted of taking down nine truss spans from the two old crossings, making alterations and rearrangements, and re-erecting the 1243 tons of old steel-work into the new bridges.

Many difficulties were met. The two crossings had a 45 deg. skew at each end which had to be eliminated. All of the truss spans were pin-connected. The removal of these pins, which were "frozen" fast with rust, was a problem. Falsework had to be built to support every panel point, as the members were removed and re-erected. Each member had to be marked so that it would be re-erected in precisely the same position in the new structure. Dismantling was complicated by transportation difficulties and proceeded slowly, because only one span could be taken apart at a time, using only two derricks. And 31,000 rivets had to be cut out and later redriven.

Despite these difficulties, Bethlehem crews, working nine hours a day, six days a week, completed the entire removal operation in three months. This is an average of only ten calendar days per span, including holidays. About the same number of man-hours was needed to erect the new bridge.

Made necessary by wartime conditions, the successful completion of this job is an example of the flexibility and versatility of Bethlehem's Fabricated Steel Construction Division. The organization that built these three new structures from two old bridges is the same organization that has constructed in record time hundreds of acres of tank factories, airplane plants, shipbuilding ways, and many other units of the arsenal of democracy.





1. Getting there, regardless of obstacles, is a specialty with Uncle Sam's Armed Forces. Here, a team of soldier-engineers is throwing a ponton bridge across a stream to permit passage of modern mobile weapons and motor vehicles. An operation like this takes teamwork in the nth degree. U. S. Fighting Men were brought up on team play. As a result teamwork is now a "cinch" for them as they carry on toward Victory.

2. "Our world-wide fleet includes over 16,000 vehicles," says J. F. Winchester (above), manager of the general automotive division, Standard Oil Company of New Jersey. "We appreciate the necessity for teamwork both with the government and within our own organization. Preventive maintenance is a policy of long standing, and our 'team' of drivers, management and mechanics is now using every means to keep vital vehicles in service."

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utes. No adjustments, except setting forks at maximum width, are necessary. Is easily removed after plowing. Specially designed with high carbon steel blade inclined at angle to act as safety trip and permit plow to ride safely over ordinary road obstructions. Is available with 23-in, high mold-board, 64 in, in overall length and plowing width of 53 in, at extreme angle setting, as well as in spring-trip models and greater widths.—Towmotor Corp., 1226 E. 152nd St. Cleveland. Ohio.



HARD HAT, known as Hedgard, is built to give three-way protection to wearer, with weight kept at minimum. Top of crown is reinforced for direct blows, side is built to stand glancing blows, and brim is flexible but strong so it will not crack when dropped. Material is not brittle and cannot



shatter. Tests show it will stand more than 8 lb. dropped 10 ft., twice standard drop-test. Weight is slightly more than 13 oz. Sweatband, which acts as shock absorber, is replaceable and may be washed or dry cleaned.—Davis Emergency Equipment Co., Halleck St., Newark (4), N. J.

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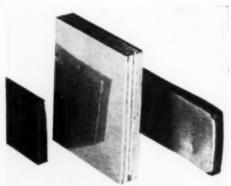
INTERCHANGEABLE SIGNALS, called Uni-Pact, include heavy-duty bells from 6 to 12-in. dia., vibrating horns, and Kodaire, all-electric air-blast horn for high power signaling. Comes complete with dead-front adapter plate which fits any standard



4-in.-sq. or octagon outlet box. Electrical connections are made only to terminals on back of adapter plate. Where bell is originally installed, it may be easily and quickly replaced with any other size bell, horn or Kodaire by turning maximum of two screws, pulling signal from plate and plugging in other type. Interchangeability means saving to industrial plants where changes in sizes and types of signals must be made frequently and speedily to meet changes in operating conditions.—Schwarze Electric Co., Adrian, Mich.



ADHESIVE BONDING PROCESS unites metals with bond stronger than riveting or spot welding and joins rubber, synthetic rubber, plastics, leather, and wood to metal or to each other with bond stronger than materials themselves. Tests indicate it would require direct pull in excess of 30,000 lb. to separate two 6-in-sq. pieces of steel bonded with Reanite. Thin sheets of stainless steel or aluminum can be bonded to Tygon impregnated plywood to form lightweight fireproof, waterproof



structural assemblies. Composite metal and plastic parts can be molded. Rubber and metal spring assemblies are possible. Application is simple, as surfaces to be joined are brushed, sprayed, or dipped with Reanite and, after drying, mild heat and pressure is applied. Joint is unaffected by fresh or salt water, is non-corrosive to metals, possesses excellent corrosion resistance in itself, and has high dielectric strength. Present uses include fabrication of airplane subassemblies, motor mounts, sound and vibration dampener units, instrument mounts, and bonding rubber or plastic insulation to wire or cable.—United States Stoneware Co., Akron. Ohio.

# 9 Important Factors That Affect Wire Rope Life

Some years ago, a lad came into the country crossroads store and announced sadly that his pet dog had died."Too bad, son," consoled the storekeeper. "Did he have a dog doctor?" "No sir," answered the lad, "he just died by himself."

Your wire rope may end up that same way. It too can die by itself because of lack of care or attention. But you can help



your ropes "live" longer... and that is most important today... by consulting a trained and experienced wire rope engineer. Macwhyte engineers (rope doctors) are always glad to be of assistance.

Then there is another thing you can do. By knowing what the most common "rope saboteurs" are, by taking precautions against them yourself, you can improve your wire rope service.

#### 9 Factors Affecting Service

There are many factors affecting the life of wire rope, but the following nine are the most common.

- 1. Abrasion or wear 5. Crushing or mashing
- 2. Bending or flexing 6. Jerking or shock
  3. Tension or stress 7. Vibration
- 4. Speed 8. Heat or friction
  9. Weathering or corrosion

In reviewing these factors, we realize that some of them are normal and to be expected, but they are, nevertheless, included because all factors need to be checked and watched to see that they do not become abnormal.

The first four listed, for example, are normal when not excessive for the particular job, equipment, size and construction of rope used. The other five are abnormal and where they exist, they should be cor-

rected if at all possible. Many working ropes are exposed to from 3 to 5 of these factors at one time.

What can the wire rope user do about them? Here are a few simple suggestions ... things you can watch for, simple changes you can make.

#### 1. Abrasion or wear

All operating ropes are subjected to abrasion as a normal part of their duty, but some abrasion is due to neglect. Watch for the causes of abrasion that may be avoided, such as scraping wire rope along the ground, pulling wire rope over sharp edges and, as illustrated (left), allowing wire rope to create a sawing action on rock or other materials. Here we see a deep channel cut into the rock by continuous and frequent contact of the wire rope with the rock as it operated back and forth.

#### 2. Bending or flexing

Too small sheaves and reverse bends are the worst offenders to rope life. Here you see an example of what excessive bending can do. This rope was run over



sheaves that were too small. The results are broken wires, ruined rope.

Watch for broken wires. Inspect your sheave diameters and check to make sure you have the wire rope construction best suited for flexibility and to meet other conditions of your operation. Where sheaves of necessity are smaller than that recommended, use PREformed wire rope.

#### 3. Tension or stress

All wire rope is subjected to tension or stress, but the problem here is to see that the rope is not overstressed for its size and construction. In some cases, it has been found that a larger rope reduces the stress or pressure and prevents the rope from stretching beyond its elastic limit for which it was designed. Consequently, longer service will be obtained on some installations by increasing the size of the rope.

To obtain the best service from wire

rope, it should not be operated beyond the recommended safe load which is a fraction of its ultimate strength and varies for different types of service, as explained in other articles in this series.

#### 4. Speed

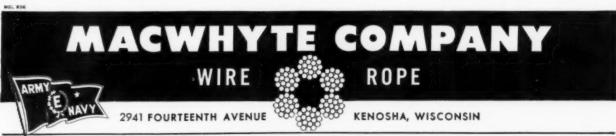
Generally speaking, the greater the speed of operation, the less service that can be expected from wire rope. High speed operation, such as on mine shaft hoists, high speed elevators, and cableway hoisting equipment, requires larger sheaves than recommended for other uses, in order to get the best life out of the rope. Speed is a definite factor affecting wire rope life, and is worthy of study if the best service is to be obtained.

Space does not permit a discussion of the remaining factors in this article; these will be covered later.

In these days of need for wire rope conservation, always feel free to write to Macwhyte Company, state your problems or what information you would like to have and Macwhyte engineers will be glad to give you the benefit of their advice and

This is Number 17 in a series of informative articles on how to get the most out of wire rope. It is directed to those who want to do everything they can to lengthen wire rope life and conserve steel. All articles in the series are available on request.





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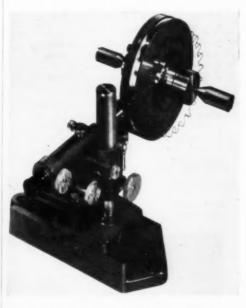
TILTDOZER is designed so its blade may be tilted minimum of 12 in. on either side or dropped parallel for straight bulldozing. Tilt is adjusted through simple worm-gear-driven mechanism manually operated by crank and equipped with hand-



set pin to hold blade stationary. Designed especially for Army Combat Engineers, Model A4 is equally suited for construction, logging, and mining. Is particularly adapted to digging "V" ditches, making initial cuts and passes, and dislodging stumps and other obstacles.—R. G. LeTourneau. Inc., Peoria, Ill.

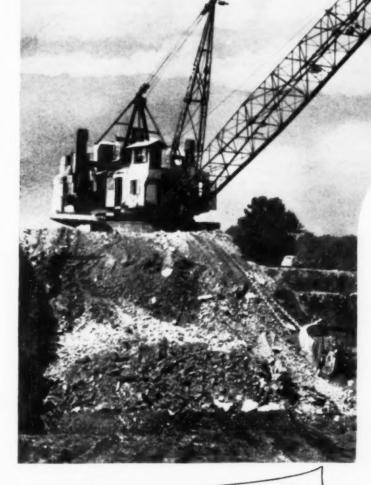


CIRCULAR DIVISION TESTER comprises two units -master circle and microscope. In use, former is attached to part to be checked and carefully contered in mount by means of two fine radial justing screws in conjunction with precise dial indicator held against special groove around peri-



phery. Microscope unit consists of base and upright for supporting microscope. Reading micro-meter is of novel design, with each complete reading obtained within eyepiece. Uniform illumination of circle divisions is provided by special fixture which clips on over objective end of microscope. Table of divisions gives angular spacing of all parts from 2 to 200.—Engis Equipment Co., 310 So. Michigan Ave., Chicago, Ill.





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pitches. When properly installed, screw leaves only small hole which can easily be sealed with plastic wood or other material. Said to assure permanent strength and rigidity, everlosting tightness for all sorts of joints and constant holding and gripping power. Recommended for building and repair of boats, trailer bodies, furniture, store fixtures and all kinds of fine cabinet work. Maker claims it will eliminate squeaky floors, cupping and buckling and will hold soft or hardwood flooring firmly and lastingly in place.—Wilson Mig. Co., 152 W. Erie St., Chicago, Ill.

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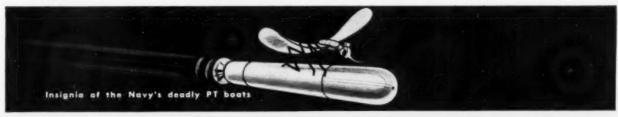
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ly by four-point bite. Automatically remove burns in pipe ends. Made of forged heat-treated tool steel. Available in 10 different sizes to fit every diameter and type of pipe or tube from 1/8 to 2 in., as well as every diameter of stud, screw, or bolt from 36 to 342 in. Set of 10 is supplied in special wooden case with selector plate that keep tool ready for every emergency.—Reps Tool Co., Inc., 99 Wall St., New York, N. Y.



SOLDERING TRANSFORMER, Type T-37, is 934x934 x834 in., not counting top portion. Disk is brass, about 1/8 in. thick, and on it are crimped two brass cups with ring of soft solder netween cup and brass disk. Pressing down on transite board springs up front edges of copper pressure shoes so disk can be slid in and is firmly pressure snoes so disk can be slid in and is firmly pressed to electrodes. With load of 9½ amp. on 222 v., soft solder can be run in 11 sec. Transformer is composed of four legs of silicon steel.—American Car and Foundry Co., 30 Church St., New York, N. Y.

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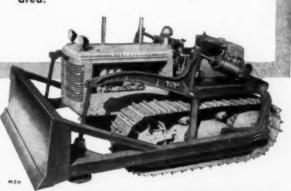


- the hydraulic system.
- 2. Inspect hydraulic oil level at beginning of each shift. Keep supply tank filled to high-level plug.
- 3. Drain the oil when it is dirty. Floating particles wear pump and valve.
- 4 Inspect threads of all pipe and fittings when exposed. Rethread or replace any parts having worn, burred or rusted surfaces.

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- 5. Use good grade lubricants. The same grease (lime-base chassis grease) used in the small hand gun for the tractor is used for blade fittings.
- Remember that a little lubricant carefully and regularly applied does a lot more good than over-lubrication only on occasion.
- Be sure to get grease to all points of bearing. Move blade while greasing in order to work lubricant into entire bearing area.





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Assn., 45 Curtis St., Middletown, Ohio.



#### ARMCO SHEETING

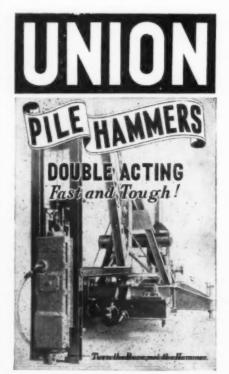
TRACTOR TYPE RODDING MACHINE weighs approximately 750 lb. and is propelled and steered with large tractor wheels, with clutch to disengage wheels from drive so it can be easily



moved around. Small wheels at each end are set down to carry weight of machine when moved and are also used to relieve weight on extre wide span by adjusting wheels to lift slightly to degree necessary to maintain proper level—Whiteman Mig. Co., 3249 Casitas Ave., Los Angeles, Calif.

\* \* \*

GAS MASK, called Protexall, offers protection against toxic smokes, fumes and gases in industry. Facepiece is of specially molded rubber. It fits any face and forms gas-tight seal. Large contoured lenses of shatter-proof safety glass give full-view vision. Dry incoming air passes over lenses, which are detachable, and prevents fogging. Head



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The SEAMAN MIXER affords absolute control of dry and damp-mix operations. Any depth from surface to ten inches suits a SEAMAN — and the mix is equally thorough at any level. Take dry-mix in soil cement, — just as an example: — there are no tell-tale "color streaks" after the SEAMAN has made its pass; — color streaks that show a carry of unmixed cement.

Study the illustration of the mixing chamber. The tines are scientifically designed and positioned to mix—not just to move materials. Every cubic inch is churned at high velocity within the chamber and leaves,—at the trailing edge of the hood,—a smooth, even path of soil and binder, uniformly mixed from surface to its full depth of treatment.

There's a lot to know about the SEAMAN MIXER and we're glad to supply complete information. Write to us. No obligation.

#### **SEAMAN MOTORS**

305 N. 25th STREET . MILWAUKEE, WIS.

Seaman Mixer processing soilcement streets on large Federal housing project. Seaman Mixer stabilizing runway shoulders with asphalt and bank run gravel.

PIONEERED



### Moretrench Mail

FROM A SOUTHERN CONTRACTOR:

"We have used your Wellpoint equipment on some of the deepest trenching that we have at Savannah Beach and it has worked Perfectly, Giving us a dry trench and allowing up to set by with a minimum of sloping the banks of the trenches with our draglines. "

Results! That's what you want from every piece of construction equipment on your job. That's what MORETRENCH guarantees!

#### MORETRENCH

90 WEST STREET, NEW YORK 6, N.Y.

CHICAGO, ILL.

ROCKAWAY, N. J.

NEW ORLEANS, LA.



**ELECTRIC TAMPER & EQUIPMEN** LUDINGTON MICHIGAN



harness is comfortable and readily adjusted by swivel buckles, which do not interfere with wear-ing of firemen's helmets. Exhalation valve is of simple design, protected against injury by metal guard. Canister contains low resistance filter for toxic smoke, dust, mists, and fumes. Chemicals absorb or make harmless all poisonous gases, etc., met in industry or fire fighting. Each mask is supplied with spare canister, which gives approximately two hours' service. Timer tells length of time it can be safely used.—American-LaFrance-Foamite Corp., Elmira, N. Y.



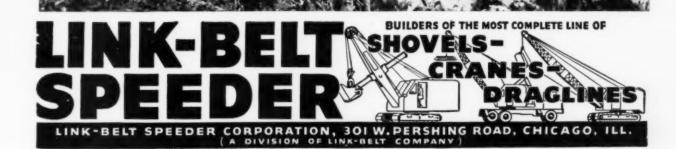
TWO-POLE ROTARY CONVERTERS are designed to keep radio interference to minimum and pro-vide best possible wave forms to facilitate all phases of radio filtering. Available in 225 and



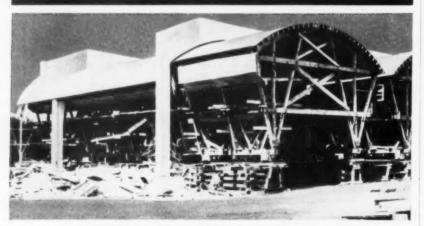
350 va. continuous load capacities at 3,600 rpm. with 40 deg. C. temperature rise. Special filter needed when converter is used for operating sensi-tive radio and electronic equipment can be fur-nished in sheet metal base upon which converter is mounted.—Kato Engineering Co., Mankato, Minn.

Write for further details,

# EXCAVATING FOR BRIDGE PIERS ON THE ALASKA HIGHWAY ... Another Link-Belt Speede The ground is frozen six inches below the surface and the going is plenty tough at the Northern end of the Alaska Highway, but that won't interfere with the rugged dependability and efficiency of this L.S.-80, owned and operated by the Western Engineering Company. For a machine that is easy to handle, yet is tough enough to take the hardest going in its stride and with a maximum in operating efficiency-you will find that size for size in comparison with any other type shovel, dragline or crane, the Link-Belt Speeder can't be beat!



# **DUFF-NORTON JACKS**



#### HELPING WITH THE HEAVY LOADS



Husky, easy-operating Duff-Norton Jacks get right in there where there's heavy lifting or lowering to be done. Convenient to carry from job to job, Duff-Nortons are quickly spotted under

A wide range of Duff-Norton Jacks speed every job of lifting, lowering, pushing and pulling-providing "mechanical muscles" for the construction industry's heavy loads.





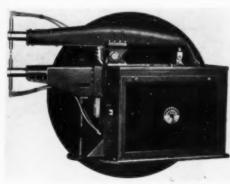




ALTERNATING-CURRENT WELDER is engineered for gruelling service demanded by 24-hr.-day, 7-day-week schedules for war plants. Heavy-duty, manually operated transformer-type welder is designed and constructed with large extra margin of safety to handle continuous welding loads. In-corporates oversized core working at low flux densities. Two open circuit voltages give wide variety of applications, particularly for welding heavy plate within machine's output range of 100-675 amp. Model 49 remains cool at work, meeting temperature rise specification of N.E.M.A. even without having its forced ventilation system in operation. Contactor with push button control for power is provided. When desired, unit can be hand to automatic operation.—Glennadapted from Roberts Co., Oakland, Calif.



ROCKER ARM WELDER is designed for condensordischarge welding of aluminum sheet. Makers claim Model B will require fewer point dressings in day's run than any other types now in use. Now being employed in production welding of aircraft assemblies, it is designed to handle any combination of two thicknesses of 24-ST Alclad, be



tween .016 and .018 in. at overall production rates of between 1,000 and 2,000 spots per hr., including point dressing time. Features include adjustable throat depth and retractable upper arm to permit insertion of flanged work, with retraction accomplished through separate air cylinder controlled by auxiliary foot switch. Upper and lower arms are of Universal type and lower knee with its arm is vertically adjustable over range of 10 in. ing arms are of 31/2 dia. hard drawn copper and current-conducting castings are of high-conductivity bronze to reduce voltage drop to minimum. Standard equipment includes solenoid operated valves for controlling air operating mechanism, air pressure gages, air regulating valves, air line lubricator, and dual shrouded operator's treadle.-Progressive Welder Co., Detroit (12), Mich.



PLASTIC ENVELOPE is designed as protective covering for work orders, blueprints, maps, charts, diagrams, and other factory and office forms. Made of cellulose acetate plastic, Kleer-Vu envelope keeps forms clean, neat, and visible. Bound leatherette edges on all sides prevent tearing or break-Patented lock-stitch on binding will not unravel. Envelope is flame, oil, and moisture-proof. Eyelets or straps can be provided. Heavier gages for heavier uses are available. Standard size is  $10x12\frac{1}{2}$  in. but other sizes can be made.—American Plastic Products, 553 S. Western Ave., Los Angeles 5. Calif.

THE DUFF-NORTON MANUFACTURING CO. PITTSBURGH, PA.

Canadian Plant: COATICOOK, QUEBEC . District Representatives in Principal Cities



#### PREVIEW OF TOMORROW'S POWER

IF you want a glimpse of how tomorrow's hard jobs will be done, look at what is doing the tough war jobs today — such jobs as building airfields in the jungle.

Look in tanks and trucks, in landing barges and patrol vessels, in tractors and auxiliaries. You'll find General Motors Diesel Engines packing them with power.

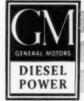
This grueling service is emphasizing the virtues of GM Diesels—highlighting their ruggedness—showing how little fuel they use, and low-cost fuel at that.

With the war won, our expanded facilities will be turned to peacetime needs, and these engines will be available for many applications where America will need dependable, economical power.



New eras of transportation follow in the footsteps of war. Another new era of transportation is assured in the wake of this war. General Motors Diesel Locomotives already are establishing new standards.

#### BACK THE ATTACK-WITH WAR BONDS







Getting approval year after year for such a span of years speaks pretty well for this pile driver. It is a simple and thoroughly dependable machine that has rapid, regular, and continuous action - it drives any kind of pile - wood, concrete, or steel. Operates at a medium steam pressure and delivers a moderate frequency of low velocity blows from a relatively heavy ram.

#### Later VULCAN Types

- With such sound design and construc-tion as characterizes the single-acting hammer it was but logical for our engi-neers to follow this first hammer basically in developing more modern types.
- SUPER-VULCAN Differential-Actin Closed Type Steam Pile Hammers, 180 -- 3000-- 5000-- 8000-- to permit under-water
- SUPER-VULCAN Differential-Acting Open Type Pile Hammers, 18c—30c—50c—80c— use 25 to 35 per cent less steam per blow— give twice the number of blows per minute.
- VULCAN Pile Extractors for pulling sheet steel, wood, concrete, H-beam, and pipe piles. Sizes 200, 400, 800.

Write for details

VULCAN IRON WORKS 331 North Bell Avenue

Chicago



Illinois

PLASTIC MATERIAL is available to replace copper and other metal tubings in industry. Flexible, semi-transparent tubing of thermoplastic Saran is characterized by unusual toughness and resistance to moisture, brines, solvents, acids, and alkalies. May be used for short periods at temperatures of 250 to 275 deg. F., though its strength and resistance are somewhat reduced at these temperatures. It is available in sizes of  $\frac{1}{8}$  to  $\frac{5}{16}$  in. outside dia. with wall thicknesses varying from .030 to .062 in.

—Dow Chemical Co., Midland, Mich.

MOBILE COOLER AND DEHUMIDIFIER for use by armed forces is now in production. Delivers cooled air through canvas ducts to permit work in broiling sun or stifling hot rooms. Combines cooling with dehumidifying and filtering and circulation of air, which is particularly important in repair, adjustment, and calibration of delicate instruments



used in war. Is competely self-contained and weighs only about 600 lb. Is highly mobile and can be wheeled over hard surfaces. Also has retractable wheels and sled-like bottom with rings attached for towing through sand or over soft

#### CUTS BUTT MORTISES ON RIGHT AND LEFT HAND DOORS

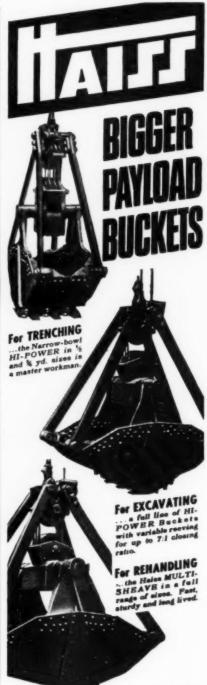


A saving in time and money can be made by A saving in time and money can be made by routing butt mortises in right and left hand doors at one time with a Carter Hinge Butt Router and Templet as illustrated. One left and one right hand door are clamped together. A templet is made slightly wider than the combined thickness of the doors, and the same length as the doors, with two or three openings located in correct position for the butts. These openings permit entry and movement of the Router to remove the wood to the required dimensions of the biness. s of the hinge

Because of its high speed (18,000 r.p.m.) and easily varied depth adjustment, the Carter Router quickly cuts perfect mortises, smooth and uniformly accurate in length, width and depth. Write today for complete information on money-making Carter Equipment.



THE STANLEY WORKS

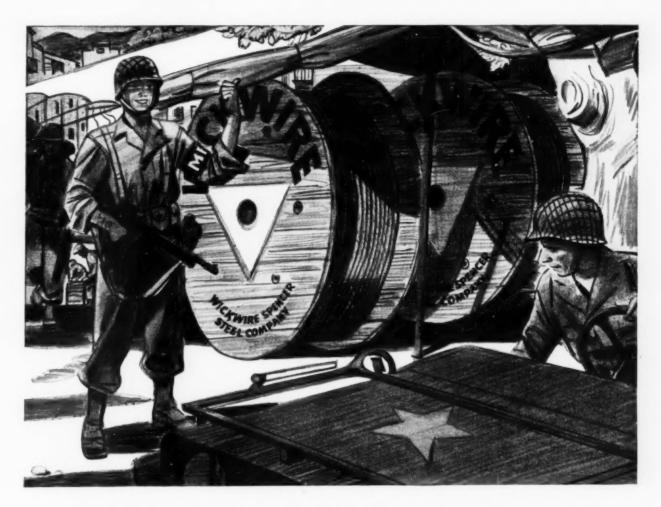


Haiss has the right bucket for your particmaiss has the right bucket to your judges ular job, engineered all the way to give you bigger pay-loads through improved design and construction. A Hass Bucket gives your and construction. A Plaise Spaces personance a chance to break its own best performance records. Every Haiss Clamshell is built to do its particular type of work better. Fifty years of skill and experience in manufacture back it up.



Bucket agencies throughout the country. Write, wire for prices, delivery and cetalogs.

GEORGE HAISS MANUFACTURING CO., INC. 140th St. & Rider Ave., New York, 51, N. Y.



## "It's here to do a job, Pal-and soon!"

"We can't get along without plenty of that friendly wire rope. What does it do? Just stick around, soldier—and how do you think that souped-up bronco you're running around in got off the boat? Wire Rope!"

The guard is right. It takes a lot of easy-handling wire rope to move the stuff an Army needs. Think of North Africa—think of Sicily! And there has to be *enough* of it!

That's why you and we at home here have to conserve the wire rope we use.

But when you do need to order replacements, won't you please accept it without reels, if lengths permit, so that handier reels can be spared for the boys out there? Wickwire Spencer Steel Company, 500 Fifth Avenue, New York 18, N. Y.



Wickwire Spencer, the first in New England to be awarded the Maritime M and Victory Fleet Flag, has now received the GOLD STAR for maintaining excellence of production.



DO YOUR MEN KNOW PROPER SHEAVE DIAMETERS?

Our FREE book, "KnowYour Ropes," will tell them. It tells why a sheave that is too small wears out rope fast. It shows how to figure the right size sheave for every diameter of rope... and gives numerous other "Life Savers" that will help make your present wire rope last longer. Send for your free copy, today!

SEND YOUR WIRE ROPE QUESTIONS TO WICKWIRE SPENCER



## WICKWIRE ROPE

Sales Offices and Warehouses: Worcester, New York, Chicago, Buffalo, San Francisco, Los Angeles, Tulsa, Chattanooga, Houston, Abilene, Texas, Seattle. Export Sales Department: New York City





ground. Minimum of critical materials is used in its construction. Both condenser and evaporator utilize steel tubes and fins and refrigerant piping is also made of steel. Use of copper and rubber was held to minimum.—Carrier Corp., Syracuse.



PHENO-RESIN GLUE combines many properties of phenol-resin, urea-resin and casein glues and is used in construction of aircraft, barges, boat keels, and other military wood products. Maker claims



it is durable, non-acid, non-crazing and adaptable to assembly gluing, laminating, hot pressing or bag gluing. Has wide range of setting temperatures and long permissible assembly period. Known as Cascophen LT.-67.—Casein Co. of America, 350 Madison Ave., New York, N. Y.



INSPECTORS' STAMPS are designed for Magnaflux work. Incorporate letters MF together with numeral or letter within specially shaped border. Border may be of any of a variety of shapes,



circular, oval, square, triangular, etc. Design indicates at glance that part has been Magnafluxed and also permits ready indentification of operator who passed part through inspection.—New Method Steel Stamps, Inc., 147 Jos. Campau St., Detroit (7), Mich.



DETERGENT TYPE LUBRICATING OIL is said to reduce wear and assure engine cleanness and oil stability for low-speed diesel engines. Prevents ring sticking, piston scuffing and excessive sludge and gum deposits. Detergency results from use of additive which is both detergent and oxidation



The original Vinsol-resin air-entraining portland cement that makes concrete pavements scale-resistant

The fact that air-entraining portland cement makes concrete pavements highly resistant to freezing and thawing and to scaling due to salt action was discovered in the Universal Atlas research laboratories in 1937-1938, and subsequently proved on this test road built at its plant at Hudson, New York, in October, 1938. Since then more than a score of pavements with this type of cement have been installed in 15 or more states.



IHIS was first proved on a test road at the Universal Atlas plant at Hudson, N. Y., built in 1938 by an experienced contractor under standard New York State highway specifications. On this road the concrete made with Atlas Duraplastic air-entraining portland cement remained 97% scale-free after 60 cycles of freezing and thawing and heavy applications of calcium chloride . . . equivalent to many years of actual service.

Duraplastic is the original Vinsol-resin air-entraining portland cement. Its commercial announcement follows five years of research by Universal Atlas in the laboratory, in the plant, and on actual jobs. It is a true portland cement in which a small but very precise quantity of the air-entraining material is interground during manufacture, in accordance with current Federal and ASTM emergency specifications.

Our Technical Service Bureau will provide detailed information about Duraplastic, the cement that makes pavements scale-resistant. Write today. Ask for a copy of "Pavement Scaling Successfully Checked." Universal Atlas Cement Company (United States Steel Corporation Subsidiary), Chrysler Building, New York 17, N.Y.

OFFICES: New York, Chicago, Albany, Boston, Philadelphia, Pittsburgh, Minneapolis, Duluth, Cleveland, St. Louis, Kansas City, Des Moines, Birmingham, Waco.

\*Trademark registered, U.A.C. Co., all rights reserved.

## QUICK FACTS

about Atlas Duraplastic Cement

- 1. Complies with current Federal and ASTM emergency specifications
- 2. Renders concrete pavements highly resistant to scaling due to the action of salts used for ice removal.
- 3. Protects concrete against the effects of freezing and thawing weather.
- 4. Minimizes segregation and bleeding. Concrete is more uniform throughout and more durable.
- 5. Permits earlier finishing.
- 6. Requires no additional materials at
- 7. Called DURAPLASTIC because it makes concrete more durable and more



For Scale-Resistant Paving

ATLAS DURAPLASTIC

**Air-Entraining Portland Cement** 

# Reliance

will speed that War Work!

PORTABLE CRUSHING UNIT with V-BELT DRIVE

mare
CRUSHING with
least
EFFORT and POWER
plus
RUGGED DURABILITY



This speedy Reliance Portable Unit can be used with equal profit — 1st — as a Crusher alone, or — 2nd — in combination with Elevator, Chute, Screen, etc. Note the low feed opening at a safe distance from the balance wheels. Note the reliable power-producing V-Belt Drive. Note the low center of gravity for stability. For strength, simplicity and economy you can't beat this or any other Reliance.

• OTHER PRODUCTS—Reliance offers a complete line of Rock Crushers; Bucket Elevators; Revolving Screens; Storage Bins; Pulverizers; Chip Spreaders; Heating Kettlee, Bin Gates; Feeders; Belt Conveyors; Grisslies; Air Separators; Sand and Gravel Spreaders; Wash Boxes. inhibitor. With its use, film coats carbon and dirt, prevents particles from sticking and holds them in suspension until trapped by filter or drained from engine.—Standard Oil Co. of Indiana. Chicago. Ill.

AIRBORNE SCRAPER AND BULLDOZER is available for use on wartime fighting fronts. Equipped with 2-yd. carryall scraper, D Tournapull has flying weight of only 31/4 tons. Big, pneumatic rubber tires give ample flotation on soft surfaces and enable it to carry heavy loads over concrete roads and





UNIVERSAL ROAD MACHINERY CO.

Kingston, N. Y., U.S.A.

DISTRIBUTORS IN ALL PRINCIPAL CITIES OF U.S.A.

### FREE OAKITE MANUAL

for construction companies and highway departments

SHOWS HOW TO DO 4 JOBS WITH ONLY 7 MATERIAL!



Use Oakite Penetrant for quickly, safely handling these four important jobs:

- 1. Cleaning cooling systems
- 2. Degreasing repair parts
- 3. Steam-detergent cleaning
- 4. Washing garage floors

Write for your FREE copy of this helpful, 12-page manual TODAY!

OAKITE PRODUCTS, INC. 24G Thames St., New York 6, N.Y.

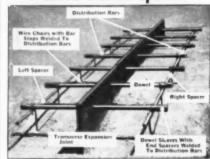
Z4G Inames 31., New York 6, N.T.
Technical Service Representatives Located
in All Principal Cities of the United States
and Canada





Insure Substantial, Long-Lasting Concrete Runways and Aprons with

LACLEDE
Welded Dowel Spacers



Time-Saving Accurate — Rigid Available Nowl



SAINT LOUIS, MISSOURI

runways. It possesses speeds up to 18.8 m.p.h. Easily convertible, it may be hooked to flat-bed trailer capable of trucking 7,000-lb. tractor, ammunition, guns, or other military supplies. Crane capable of 4,000-lb. lifts can replace trailer. Close-coupled, compact in design and ruggedly built, it affords quick, one-man wartime operation. Company engineers also predict its peacetime use on farms, in factories, and for township needs.—R. G. LeTourneau. Inc.. Peoria. III.

Improved Gluing Equipment and Quick-Setting Glues Speed Modern Construction

GLUING EQUIPMENT has improved to keep pace with the development of water-proof and water-resistant construction glues, according to an announcement by the I. F. Laucks Co., of Seattle, Wash. Where glue formerly required hours under heavy pressure to set, the hot-plate press and quick-setting glues today produce the completed bond in from 3 to 10 min. This company also reveals that special glue machines that spread glue simultaneously on both sides of the studding

VETERAN ROLAGRIP PIPE COUPLING

Honorably Discharged from Grueling Mine Duty!



## KEYSTONE COPPER COMPANY

MAIN OFFICE 410 Thorne Avenue P. O. Box 886 Fresno, California

Petroleum Equipment Company, 17th and Connecticut Streets,

Gentlemen:
You may be interested in a little history of the use of the rolagrip couplings which were explained and sold to us by your Mr. Frank Merkel way back in 1941.
We were facing the unwatering of an old mine shaft (vertical, and we planned a two stage pumping job - pump first down to the 525 foot level, and install the 40 H.P. 2 stage centrifugal pump, with which we would unwater, on this level. Then go on down to the bottom level, the 675, with a smaller pump, pumping up into the 525 foot level sump.

Stage centrirugal pump, with which we would unwater, on this level. Then go on on the stage centrirugal pump, with which we would unwater, on this level. Then go on level sump.

Omy. We found a bunch of used, but good, boiler tubing 3; "0.0. We planned on This was an economy job. New pumps, but everything else had to spell econwelling on 3" butt end threads for the screw joints, and using it for discharge welding on 3" butt end threads for the screw joints, and using it for discharge welding on a dozen and started pumpling from the surface. We placed a small pipe. But, with good fortune we had a relagrip coupling described to us by Mr. Merkel.

We ordered 3 or 4 dozen and started pumpling from the surface. We placed a small bend which directly over the shaft opening, with the cable gripping the pipe near the bottom. We lot the pipe down as the water lowered, and kept putting on the the bottom. We lot the shaft timbers after two or three lengths had been lowered, but clamp the pipe to the shaft timbers after two or three lengths had been lowered, but clamp the pipe to the shaft timbers after two or three lengths above the cable hitch would bow in an arc across the shaft compartment, but as nothing after a while, we found that we could grip the pipe string in the middle, with many cable hitch, through which water was being pumped and it throbed and jerked, but happened, we kept on going. We had as much as 200 feet of pipe hanging below the the rolagrips held tight. After we got down, the same pipe line, with many of the rolagrips held tight. After we got down, the same pipe line, with many of the rolagrips held tight after the pipe, it was always such an easy with the mode at the rolagrips and down the shaft for the "conventional" union. The boys meast a thin or weak place in the pipe, it was always such an ead with the shaft town, unfained the rolagrips and down the shaft for the "conventional" union. The boys meast a thin or weak place in the pipe, and another just that length, brought it down, unfained where t

dish

Superintendent.

## ROLAGRIP

ull information regarding G-B Rolagrip Couplings for plain end pipe is bound to stand every superintendent and engineer in good stead at some time or other. Shall we send it to you NOW?

#### GUSTIN-BACON MANUFACTURING COMPANY KANSAS CITY 7, MISSOURI

New York Philadelphia Chicago Tulsa Houston San Francisco

Send full information on Rolagrip Pipe Couplings for plain end pipe. FIRM NAME.

ADDRESS\_ CITY STATE



## an OWEN FEATURE



Properly proportioned, correctly placed weight in an Owen Bucket gives the operator complete control under all conditions whether digging on a low angle or below his line of vision in a pit or swiftly moving river.

#### The OWEN BUCKET Co.

Breakwater Avenue, Cleveland, Ohio Branches: New York, Philadelphia, Chicago, Berkeley, Cal.



OWEN BUCKETS

## **RIGHT AT HOME**

### digging rock and stone

YOU COULDN'T put this bucket on a tougher job. For years it has been helping deepen a ship channel,—digging in hard flint bottoms one day, handling rocks and stones on other days. Yet, because its lips and teeth are protected against rapid wear with Coast Metals Hard-Facing, it has been rendering outstanding performance

Your bucket teeth, lips, runners and other parts also can be given a new lease on life by Coast Metals Hard-Facing! Or, better yet, hard-face your NEW bucket parts and they will serve ever so much better. Then, after slight wear, they can be rebuilt repeatedly and the cost and delay of getting replacement parts eliminated.

Write for "How To Make Construction Equipment Last Longer"





COAST METALS, INC.

Plant and General Offices: Canton, Ohio
Executive Offices: New York, N.Y.

COAST METALS
hard-facing
weld rods

MAKE YOUR EQUIPMENT LAST LONGER

for wall partitions are now being employed in prefabricating plants.

On several prefabricated housing projects near Bremerton, Wash., women are being used as "water girls" and "clean-up and patch-up" helpers. They are being paid the same wages as men for these jobs.

New Booklet Gives Tips on Operation of

### Excavators

economy of distance and economy of time are the two primary factors in excavator operation, according to a new booklet giving tips to operators prepared by the Bucyrus-Erie Co., of South Milwaukee, Wis. It lists the following rules:

- (1) Figure enough trucks to handle your shovel's capacity on the length of haul worked and then add one or two, depending on the length of haul, to insure continuous loading.
- (2) Set up a traffic system that keeps hauling equipment rolling with even distribution. Avoid bunching. Plan servicing to release trucks from shop at regular loading intervals to start shovel morning and noon.
- (3) Double spot if bank layout is suitable. Spot trucks in close to bank for short-swing loading and always at the same spot relative to excavator so the operator does not have to hunt for the truck. Spot in line with swing and so dipper does not have to pass over the cab. Setting a log or tie for a spot "bumper" may help.
- (4) Keep bank well blasted if blasting is necessary. Be sure that blast holes are deep enough to break out toe well under grade. Scratching out half filled buckets in twice the normal loading time divides output by four and multiplies maintenance by six.
- (5) Avoid unnecessary wear and overstress, since repair parts are now hard to get. See that repair parts are ordered as soon as need is indicated and make repairs promptly. Putting off a necessary repair job usually involves extra stress on adjoining parts, slows down production because operator must favor the weak part, and often means an expensive

(Continued on page 112)





## Ransome. 34E DUAL DRUM PAVERS

Ransome's Hydraulically Controlled Boom Bucket (Pat. Appl. for) in the field for over 2l/2 years gives you these profit-increasing advantages . . .

- · Eliminates split batches on narrow roads and at expansion joints.
- Permits discharge of any part of bucket load at any bucket position on boom without returning the bucket to paver. Boom can then be swung to next slab to discharge the balance. Thus, each time a split batch is avoided, a batch in mixing time is saved.
- Allows a batch of concrete to be spread completely across a 25 foot runway with pover working outside of form.
- Clearance from ground to bottom of open bucket gates is 25 inches for clearing template pullers and scratch boards.

These are but four of fifteen reasons why you should investigate. Write for Bulletin No. 195.



RANSOME MACHINERY COMPANY
Subsidiary of the WORTHINGTON PUMP AND MACHINERY CORPORATION

DUNELLEN NEW JERSEY

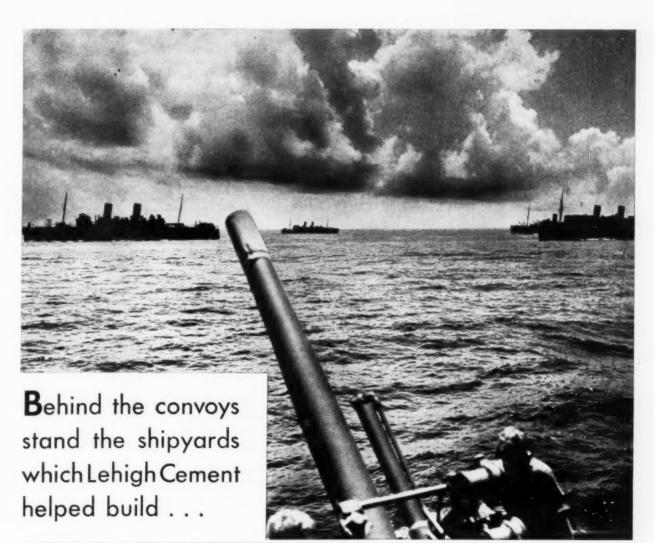
(Continued from page 110) mid-shift breakdown that may break other parts or injure employees.

- (6) Buy good grade lubricants and genuine repair parts. Keeping equipment well painted not only protects it from the weather but also encourages the crew to operate carefully and to keep the machine clean and well adjusted. The army paints all lubrication fittings red—not a bad idea.
- (7) Give your personal attention to insuring clean fuel and lubricants. Be sure these come to the job clean, are kept clean in storage, and stay clean when applied on the machine.
- (8) Do not forget to give the boys a pat on the back when they deserve it.

#### Proper Adjustment of Parts

Importance of properly adjusting all parts is emphasized in a section which discusses adjustments for each part in turn, as follows:

- (1) CLUTCHES: Adjust at normal operating temperature. Reverse bands, if reversible, to distribute wear when deadend has worn off about one-third. Do not use compounds on bands. Always keep bands and housings clean. If pins and holes on control levers are worn, install new oversize pins or build up parts by welding to remove play. Clutch bands require adjustment more frequently when new than after they are properly worn in.
- (2) BRAKES: Don't let bands wear down till rivets score housing. Adjust carefully to get a sure grip. Always be sure they release freely and evenly all around. Don't "ride" the brake pedal. Keep pedal springs just tight enough to raise pedal to top position.
- (3) Boom Angle: Shovel booms are usually worked at 45 to 50 deg. for general digging. Lowering gives a longer cut in a shallow bank at a better hoist rope angle. You, of course, also lower for extra reach. Raising increases dumping height and improves stability for heavy digging. Keep boom hoist always in good adjustment. Test occasionally when on work where boom hoist is not used. Check safety devices regularly.
- (4) DIPPER-TRIP: Replace latch and keeper or rebuild metal when necessary. No dipper-trip mechanism can function properly with a worn-out latch. Use the shortest latch adjustment that will catch and hold securely. A good power-trip pays big dividends. Keep adjustments right, always.
- (5) DIPPER PITCH: Often neglected, the right pitch is always worth while when (Continued on page 114)





LEHIGH EARLY STRENGTH CEMENT for service-strength concrete in a hurry



MINUTES are precious in shipyards today. Vessels to carry world-wide cargoes, and fighting ships to guard the sea-lanes, are being turned out at amazing speeds. That's only possible with the help of every American industry, and Lehigh Cements share the job.

Concrete for vital shipyard installation is quickly and efficiently made with Lehigh Portland Cement. In cases where speed is of the essence, Lehigh Early Strength Cement comes to service-strength 3 to 5 times faster than normal cement, and gives a finer, denser concrete, too.

There's a place for Lehigh Cements in every industry, whether for war or private work. Lehigh's Service Department specializes in solving special problems. Why not write and let us help you?

LEHIGH PORTLAND CEMENT COMPANY . ALLENTOWN, PA. . CHICAGO, ILL. . SPOKANE, WASH.

## IN WARTIME AS IN PEACETIME

This famous 107-year-old name and trade mark signifies wet weather protection to men serving their Country in various branches of the construction industry and in our armed forces.



LIMITED SUPPLIES OF TOWER'S OFFED SUITS, COATS and HATS HAVE BEEN ALLOTTED to MOST DEALERS. WE URGE that EVERY EFFORT BE MADE to

#### 'PRESERVE YOUR SLICKER'

Write for our FREE folder giving valuable tips on how to do it.

ASK FOR SPECIAL FOLDER CM

FULL SUPPLIES OF TOWER'S OILED and LATEX TREATED WATERPROOFS WILL BE AVAILABLE AFTER VICTORY

A. J. TOWER CO. BOSTON, MASSACHUSETTS

## HERE'S THE New GRACO CATALOG



## LUBRICATING EQUIPMENT (

A new catalog describing Graco quality Lubricating Equipment is now ready for distribution. While the major portion of Graco production continues to be devoted to the war effort, many items of the Graco line of lubricating equipment are now available. You will want the new Graco catalog to see the equipment and accessories that can be obtained and to learn of the new items and new prices. Here is an unexpected and long awaited opportunity to obtain the Graco equipment you need. Copies of the new Graco catalog will be sent on request.

See your Equipment Distributor or write for Catalog No. 133.

## GRAY COMPANY, INC.

(Continued from page 112)

you are digging a like bank for several shifts or more. In general the pitch should provide a line of penetration parallel to your average angle of bank. If you are having trouble with tooth breakage check pitch for possibility of taking stresses of hard digging more directly in line with teeth.

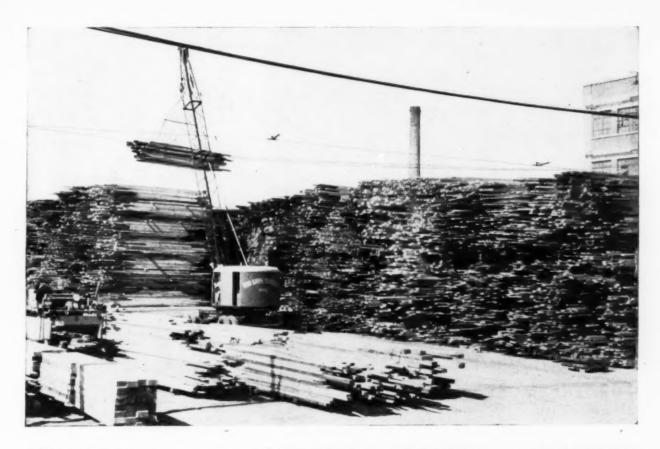
- (6) CROWD ROPE OR CHAIN: Keep your crowd adjustments fairly snug. Combine crowd action with hoist action to obtain easy penetration. Remember the purpose of the crowd is to apply pressure enough to hold and lead the dipper teeth into the bank rather than thrust directly forward to force the dipper into it. Don't hoist with the greenhorn shoved in tight against the saddle block.
- (7) CAT BELTS: Belts should be kept as loose as possible without losing proper tracking of the driving tumblers. Firm footing permits use of a tighter belt than is advisable in mud or loose earth. When traveling for a distance on pavement or other hard surface, tighten belts to prevent "slapping."
- (8) DRIVE CHAIN: A too tight chain wears rapidly. A chain too loose will slap and may result in destructive jerks when load is applied or released. Check adjustment regularly and keep just right.
- (9) OPERATING LEVERS: Inspect control lines regularly to eliminate lost motion. Keep pins snug. Redrill and put in oversize pins or new bushings when needed. Straighten or replace bent rods. Adjust to distribute control action over full swing of lever but be sure to leave safe release margin.

# Full Investigation of Accidents Helps Prevent Recurrence

By B. H. SELF Supervising Engineer Travelers Insurance Co. Hartford, Conn.

when something goes wrong, we have to know what it is and what causes it to go wrong before we can fix it. An accident is the best example of something having gone wrong—the man, the material, or the method. Somebody or something failed or the mishap would not

have occurred. Since an accident is evi-(Continued on page 116)



# GENERAL

recommends the continued purchase of War tinued purchase of War Bonds and Stamps—and the observance of preventive maintenance to keep your machinery running efficiently.

# MOVE MORE, FASTER, AND FOR LESS COST

The General Supercrane is a necessity on any job that requires more work per day . . . more speed on the jobs . . . lower operating costs.

How can the General Supercrane do all these things for you? It is self-propelled . . . mounted on pneumatic tires . . . operated by one man . . . powered by one engine; conserves manpower and fuel.

## OSGOOD COMPANY

Sizes: 1/2 to 21/2 Cu. Yd. Diesel - Oil - Gas - Electric

Associated with The GENERAL EXCAVATOR CO.

### HERCULE/ COMPANY

HERCULES
\*IRONEROLLERS\*
6 to 12 Tons
Diesel or Gasoline

Associated with The GENERAL EXCAVATOR CO.

## GENERAL

Sizes: 3/8-1/2-5/8-3/4 Cu. Yd. Diesel—Gas—Electric

OSGOOD MARION OHIO U.S.A. SI

SHOVELS
DRAGLINES - CRANES
Crawler & Wheel Mounted

THE GENERAL EXCAVATOR COMPANY, Marion, Ohio



## TRUCK WITH THE PLUS QUALITY

### FOR THE MOST DIFFICULT SERVICES

Why do the men in the armed services of our own, and other countries, prefer Marmon-Herringtons, so generally, for the extra-difficult jobs? Possibly because Marmon-Herrington All-Wheel-Drive trucks are not war babies, having had the "bugs" worked out in more than ten years of manufacture before the war began. Marmon-Herrington led the industry in improving the design and performance of heavy-duty multiple-drive trucks, following the first world war. It was Marmon-Herrington, too, that originated the conversion of standard mass production trucks and passenger cars (forerunners of the modern Jeep) to All-Wheel-Drive years before the present war started. Naturally, these pre-tested vehicles provided superlative performance from the start, and endeared themselves to thousands of men who will demand the same "plus qualities" in the trucks they drive when the war is over.

#### MARMON-HERRINGTON

All-Wheel-Drive

MARMON-HERRINGTON COMPANY, Inc. CABLE ADDRESS: MARTON . INDIANAPOLIS 7, INDIANA, U. S. A. (Continued from page 114)

dence of something gone wrong, it follows that we ought to get to the bottom of the "how" and the "why" to prevent

its going wrong again.

There ought to be a "best" way for doing this. Let us first make a list of what we want to find out and then see how we should go about it. The man is the most important thing on any job, so we will start with him.

- (1) Is this his first accident?
- (2) If not, how did the others occur? Was he at fault?
- (3) Did he take an unnecessary chance, bringing this accident upon himself?
- (4) Had he been informed as to the dangers involved and instructed as to safe working practices?
- (5) Did he follow instructions?
- (6) Was he hurried on this job?
- (7) Was the work well planned?
- (8) Just who is at fault—the injured, his fellow workers, or his foreman?
- (9) What action can be taken now to prevent a recurrence?
- (10) Has this been done?
- (11) Are any other employees following the practice that caused this man to become injured?

#### Material and Equipment Check

A check on material and equipment is less involved. It should be discovered:

If tools or equipment being used were defective; if adequate working equipment was provided; if the necessary protective equipment was available and, if so, if it was being used in the right way; and if the lighting was adequate.

In order to get this information-and there is no point in starting after it unless the correct and complete story is learned -it will be necessary to: (1) Go to the scene of the accident and check the physical defects; (2) Get the full story of the man who was injured; and (3) Get the story of others who were working with him. The time to begin to investigate an accident is as soon after it happens as you can get to the place where it happened.

Whenever we come to inquire as fully into the whys and wherefores of accidents as into the causes of other job interruption, we will start getting results, because we cannot intelligently proceed with righting the wrong until we have the correct and complete facts in our

possession.



CARE FOR YOUR ROPES-THEY'LL CARE FOR YOUR NEEDS LONGER!

Give your wire ropes a chance to show you how they're built for long service. Don't expect them to operate properly with worn sheaves, lack of proper lubrication, or incorrect installation. Roebling has printed a useful reminder—a card with conservation data. You can tie it right on your rope-rigged equipment so everyone handling the equipment can see it—follow it, for longer operating service—greater efficiency. Write for Tag "A", We'll send as many as you need.

JOHN A. ROEBLING'S SONS COMPANY
TRENTON 2, NEW JERSEY
Branches and Warshouses in Principal Cities



# War Gives New Importance to Care of Rock Drills

proper care and maintenance of rock drills is now of particular importance, since these tools are working overtime and being subjected to an unprecedented amount of punishment in war production. They help build much needed air bases, hydro-electric power projects, and tunnels for dewatering mineral areas; help provide stone for strategic highways and buildings; and mine great quantities of ore for steel mills. Because of their importance, the Compressed Air Institute has issued a number of recommendations for keeping rock drills in working condition.

"In addition to being a precision-made tool, the rock drill must be extremely



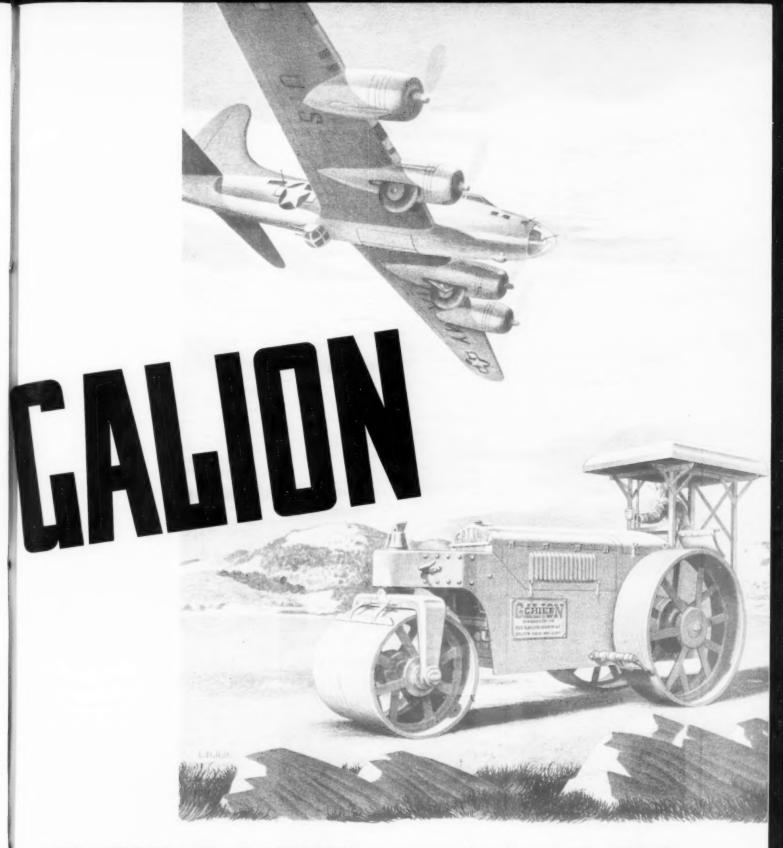
PISTON IS SPALLED on striking face, as result of striking corner of drill steel when drill is out of line.

durable and steady," the institute points out. "The piston, for example, strikes 1,800 to 2,200 hard blows a minute against a drill steel shank. In order to stand up against such punishment, special attention must be devoted to materials, machining and heat treatment. The average drifter piston requires approximately 55 hr. to make, but it can be spalled or broken through careless, improper operation."

#### Proper Lubricant Essential

As it comes from the factory, the air hammer or drill should have a coating of oil or grease on all working surfaces, but when the drill is placed in service the oil reservoirs must be filled with the proper type of lubricant. The use of air-line lubricators is recommended, and they too should be filled with a good grade of rock oil. Before the air hose is attached to the

(Continued on page 120)



### "HOW SMOOTH WAS MY TAKE-OFF?" — "How Smooth was my Landing?"

That depends, Mr. Pilot, a great deal upon the condition of the airfield. Smooth it was if Galion Rollers had been there first. These versatile units, like our pilots, provide top performance both here and over there — they can 'level off' with as much ease as you maneuver your plane. They are essential, too, in modern, mechanized warfare.



THE GALION IRON WORKS & MFG. CO. Main Office and Works: GALION, OHIO

MOTOR GRADERS

**ROAD ROLLERS** 

**SPREADERS** 

# A few of the Jobs SYNTRON ELECTRIC HAMMERS



can do for You!

in addition to drilling Concrete



Bush Hammering Concrete Surfaces



Vibrating Concrete Forms



Removing Mortar For Waterproofing

Quickly—Easily—Economically 3600 Powerful Blows Per Minute from ordinary 110 volt A.C. lighting current.

Illustrated and described in Catalog No. 430

SYNTRON CO.
500 Lexington, Homer City, Pa.

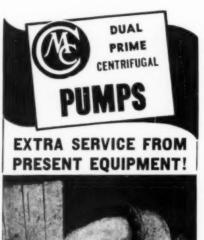
(Continued from page 118)

drill or hammer, it should be blown free of any dirt or other particles that may clog the tool and cause serious damage. The air in the line should be free of moisture, which is most damaging to air tools because it washes away the lubricant, may freeze the valves and parts, and is harmful in other ways. Intercoolers, aftercoolers, and water traps all contribute to drying the air.

#### Drill Handling Important

The user should be instructed in the fundamentals of good rock drill operation. One of these fundamentals is the proper method of handling the drill. The instructor should emphasize how important it is that the machine be kept in line with the drill steel. When the drill is out of line, chuck bushings wear rapidly; and when this occurs the piston strikes the corner of the drill steel, and spalling results. Holes drilled by dry hand-held sinkers should be blown frequently to keep the bit from binding. If drilling is done in moist ground, a wet machine should be used. The water flowing through the drill steel will prevent plugging of the bit and will also prevent

(Continued on page 122)





The simple design and case of maintaining and servicing CMC quipment are features that mean money in the postets of summer today. Your nearest CMC distributor is ready to help you get EXTRA SERVICE from your present equipment.

CONSTRUCTION MACHINERY CO.

Your Safest Bet, for Tight, Trouble-Free Connections on Suction and Water Hose....



## "KING" Malleable Iron SHANK COUPLINGS

Strong, carefully made couplings of uniform quality, threading and dimensions. Easily inserted in hose and quickly connected and disconnected. Shanks have deep, clean corrugations. Pin lug swivel nuts are well recessed to hold washer when hose is disconnected. Heavy Pattern (Illustrated) has shanks long enough for two clamps, and pin lugs on both male and female ends. Sizes, 3" to 8", inclusive. Regular Pattern has pin lugs on female only, and shanks designed for one clamp. Sizes 1½" to 3", inclusive.



## "KING" HOSE CLAMPS SINGLE BOLT DOUBLE BOLT

The strongest clamps of their kind, and easiest to attach. Bolt lugs are heavily reinforced. Tongue, and ears for vise jaws, are full width of clamp. Perfect conformance to hose circumference, with broad bearing surface, insures equally distributed compression when clamp is tightened, without cutting into hose cover. Double Bolt style has quadruple take-up, providing exceptional gripping power. Sizes: Single Bolt, for hose  $\frac{7}{8}$ " to  $\frac{51}{4}$ ", O.D., Double Bolt, for hose  $\frac{31}{2}$ " to  $\frac{171}{4}$ ", O.D.

Carried in Stock by Manufacturers and Jobbers of Mechanical Rubber Goods.

Buy WAR Bonds . . . Buy MORE Bonds!



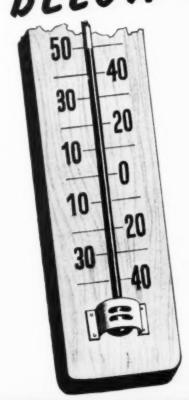


# **NO SLOWDOWN**

IF YOU USE CALCIUM CHLORIDE

IN ALL CONCRETING

BELOW 50 DEGREES



When the temperature drops from 70 degrees to 40 degrees it takes twice as long for normal concrete to acquire safe opening strength. But by using 2 pounds of calcium chloride for each bag of cement, this difference in temperature is overcome, and opening strength is attained in the same time as during the summer months.

Why waste this valuable time when the use of calcium chloride will compensate for the reduction in temperature and put you back on normal 70 degrees summertime operating schedules for placing, finishing, removal of forms,

Concrete with calcium chloride has greater strength at and opening for use.

Use calcium chloride in all Portland Cement Concrete all ages tested. placed at 50 degrees Fahrenheit or lower. Get your copy of the new book "Early Strength Concrete" explaining methods, amounts to use and results of tests by the National Bureau of Standards.

CALCIUM CHLORIDE ASSOCIATION Detroit 26, Mich. 4145 Penobscot Bldg.

## LCIUM CHLORIDE

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### MERCER

"The Name that Carries Weight"



### **EQUIPMENT**

for the

## HANDLING

of

CONSTRUCTION

# MATERIALS

Cranes, Elevators, Lift & Trailer Trucks, Conveyors, Live Skids, Drum Hoists, Winches, Tool Wagons, Carts.

WRITE FOR DETAILS

**MERCER-ROBINSON COMPANY** 

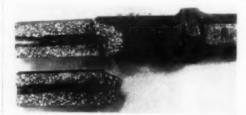
INC

30 CHURCH ST. . NEW YORK 7, N. Y.

(Continued from page 120)

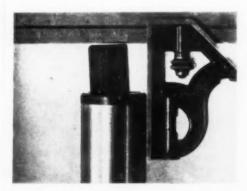
"mud collars," which often stick the steel. Failure to keep the bit properly sharpened is one of the most frequent causes of bit breakage. Dullness, in addition to lowering drilling efficiency, puts undue strain upon the wings of the bit.

The cylinder front washer in the drill should never be permitted to become ex-



MANUFACTURERS' INSTRUCTIONS on length of shank should be carefully followed, since drilling speed is reduced when shank is too short because piston does not strike with full force and long shanks tend to short-stroke machine, again reducing power of blow.

cessively worn, because this will destroy the cushion at the front end of the machine and cause breakage of fronthead parts and pistons. Neither should chuck bushings in the drill be permitted to wear unduly, for this will prevent the piston from striking its blows squarely on the shank of the drill steel—which in turn will cause the piston to spall or fracture. The chuck bushings may wear out pre-



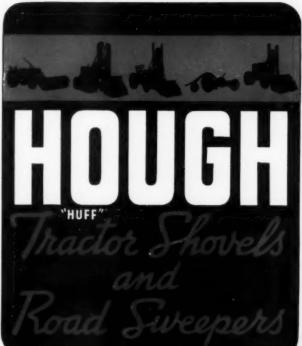
WORN CHUCK BUSHINGS cause play in drill shank.

maturely if the diameter of the drill-steel shanks is too small or if the machine is not in line with the drilled hole. The end of the shank should be ground square so as to distribute the force of the blows evenly over its surface.

#### Lubricator Types

Much scoring can be prevented by lubrication. A lubricator in the air line is recommended and can be easily and

Continued on page 125)



### Not Ready to Retire!

"WM" Tractors are out of production, so prospec-tive users of Hough Models "WM" and "WMX" Shovels must wait until the manufacture of this class of machinery is again permissible. Meanwhile, owners of this equipment should take full advantage of these profit factors:

(1) Make broader use of your Hough equipment on new and unusual applications.

(2) Prolong the useful life of your Hough equipment by proper maintenance and operation. The following suggestions will prove helpful.

Shorten snap chains to increase dumping height on free-dumping material . . . Use special width buckets for rehandling and light materials loading (your dealer has the details) . . . Hardface bucket cutting edges for maximum bucket life . . . Keep cutting edges sharp for bigger loads and faster loading . . . Use counterweights to provide in-



## for Hough Shovels

For bank and slope cutting—For boosting wagon scrapers and trucks—For charging concrete mixers, asphalt plants and black topping machines—For cleaning up inside of forms, trenches, pits and basements-For gondola car loading, using ramp—For setting pipe, culverts and lighting standards—For pulling poles and shoring. Of course, the tractor is available for all normal uses.

creased load capacity on front end . hydraulic system clean . . . Use only SAE 10 oil (U. S. Engineers OE10) . . . Lay out your job properly to do as little turning as possible for maximum crawler life . . . Don't turn in softgoing; run straight across the job.

Can we help you with your operating and maintenance problems?

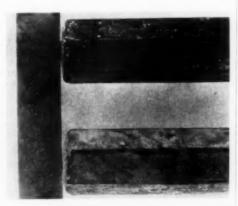
THE FRANK G. HOUGH • Libertyville, Illinois •



(Continued from page 122)

quickly installed. It feeds oil into the air line by means of an adjustable needle valve. The atomized lubricant from this important accessory will flow at a temperature determined by the grade of oil

Oil used in sinkers, stopers, drifters and paving breakers, should be well refined petroleum oil, clear and free from suspended matter and water; or should be a well refined petroleum oil compounded with a sufficient quantity of animal oil



SHANK ENDS should be ground square. These are improperly ground.

to form a satisfactory lubricant for rock drills where water or wet air is encountered; or should be a good grade of free flowing liquid grease which will not separate upon standing. Castor machine (aluminum soap) oils, or oils containing graphite are not approved.

#### Steel for Rock Drills

Drill steel for rock drills should be of the type that will withstand repeated forgings and poundings. An ample supply of sharpened steel should always be kept on hand to prevent any work stoppage due to inadequate supply. When in storage, drill steels should be kept sorted so that the operator or blacksmith does not have to rummage through an odd assortment to obtain the proper type and size. Detachable bits eliminate the need for hauling large quantities of steel back and forth between the forge shop and the job, and they also reduce the amount of steel tied up in one place. Most sizes of detachable bits may be reground several times.

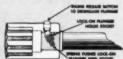
"Care of Rock Drills" will be continued in an early issue of "Construction Methods."

# NEVER BEFORE A WRENCH CATALOG LIKE THIS



## Streamlined — Complete Wrench Information for Your Wartime Requirements





Sockets can't come off accidentally to damage machinery, slow up work or injure men.



Easily and quickly disengaged by pressing "Thumb-Release" button. Built for busy wartime buyers and users of wrenches! Contains dictionary of popular wrench terms—tells how to select wrenches for extra speed, safety and utility. Shows newest developments in completely interchangeable socket wrenches—and many exclusive Blackhawk wrench features. Items listed are all scheduled for wartime production—and include Socket Wrench Sets with handles, extensions and ratchets—open ends, box types, and heavy-duty wrenches—for all kinds of construction, repair and maintenance work.

Remember — Blackhawk Wrenches are famous for quality, strength, slim, trim design — are light and easy to handle. Send coupon today — or see your Blackhawk Distributor.

A Product of BLACKHAWK MFG. CO. Department W3103, Milwaukee 1, Wisconsin

BLACKHA	WK	MF	G.	CO
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Department W3103, Milwaukee 1, Wisconsin Please rush new wartime Catalog No. 243.

Name...

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Address..

BLACKHAWK



## NEWS FROM MANUFACTURERS

About Their Products

The publications reviewed below, will keep you posted on latest developments in construction equipment and materials available for your use.



EARTH MOVING LAND CLEARING A SNOW RE MOVAL EC IT-La-Plant-Choate Mig. Co., Inc., Cedar Rapi s wa. pp., illustrate) escr and pictures og ipment for use with Cate pi a diesel tractor. Cove tead ejection, high-spee ni front and rear dusping mor" scrapais; scrapet pushers, sheep and temping

rollers, rippers, trailbuilders, bulldczas tree ozers. brush cutters, root cutters, rake 11 e., stinger blades, weed eradicators, stump spiers, and

## For SPEED and SAFETY ...





You gain speed through the easy handling, strong leverage and straight-line application of power on LOWELL REVERSIBLE RATCHET WRENCHES.

The improved new types of LOWELL WRENCHES are the result of more than 70 years experience and development—1869 to 1942. They are made in a wide range of types and sizes for all classes of heavy construction, erection and maintenance. Have patience with your dealer if he is unable to furnish all of the numerous LOWELL types and sizes, for we are engaged, for the duration, in supplying the needs of our Armed Forces.

#### LOWELL WRENCH CO. 1849 WORCESTER, MASS., U.S.A.

LOWELL **Reversible Ratchet** WRENCHES



See how each pawl, when see now each pawi, when engaged, transmits leverane from the solid stock of the handle, direct to the gear, in a straight line and with a "square" contract. The pawl is in COMPRESSION ONLY no shear, no tension, no tor-sion. The shipper carries NONE of the load. This strong construction insures steady service. LUBRICATING SYSTEM-Farval Corp., 3293 80th St., Cleveland 4, Ohio (8 pp., we color) Ex-plains "Multival" system for providing positive lubrication to group of bearings ir a central distributing block. Oil or grease is supplied to multiple valve blocks by means of man r poweroperated portable gun. By making single connec tion, operator delivers exact measured charge of lutricant to as many as 10 bearings at one time. Multival block is pictured in phanicm to illustrate measuring and distributing mechan in ni opera-tion of tell-tale indicator which sign is that bearing has been filled with lubricant on a prossure. Two pages are devoted to photographs and drawings of various fittings by which system can be installed on wide variety of machines.

Square, Troy, Ohio. (24 pp., illustrated). Furnishes inforillustrated). mation on arc welding, with suggestions for better welds and more production. De-scribes three types of arc Deare welding-bare metallic, shielded metallic and carbon, Explains essentials of proper arc welding procedure. Shows how savings can be effected

WELDERS' VEST POCKET GUIDE-Hobart Bros., Hobart

on electrode costs. Includes trouble check chart which tells what to do in various emergencies. Contains other handy reference information. Illustrates and de scribes welding symbols.





Operating a carrier and producing industrial friction materials have nothing in common except this: it takes "know-how" to do either job right.

38 years experience has given Raybestos the essential "know-how". Raybestos means: 1) correct and dependable brake linings and frictions, specially engineered to meet the exact requirements of every machine that you operate; 2) friction materials that actually improve the original performance of older industrial equipment; 3) a single source of supply for all your needs; 4) fastest deliveries through your local Raybestos distributor. Specify Raybestos — now.

THE RAYBESTOS DIVISION of Raybestos-Manhattan, Inc., BRIDGEPORT, CONN.

RAYBESTOS IS AMERICA'S BIGGEST SELLING BRAKE LINING

Ray bestos INDUSTRIAL FRICTION MATERIALS

FOR SHOVELS . CRANES . HOISTS . TRACTORS & EARTH MOVERS



In the many battles of this war, one salient fact has emerged. The army having command of the air usually wins the battle.

On the ground, too, command of the air is important! Air for the drills and air tools that are helping to build the airports mushrooming all over the world must be perfectly controlled—ready to serve wherever and whenever it is needed. That calls for compressors that must be able to operate dependably, day after day.

Gardner-Denver equipment fits that description. Gardner-Denver water-cooled compressors are supplying compressed air for drills and air tools dependably—without costly and time-wasting interruptions. They require no special attention—no pampering. Regardless of weather conditions—heat or cold—altitude extremes—they continue to deliver full capacity.

Gardner-Denver Sinking Drills are equally reliable. They are noted for their high footage and their exceptional hole-cleaning ability. They are easy riding and air requirements are low.

For further information on these rugged, dependable aids to better, faster construction, write for descriptive bulletins. Gardner-Denver Company, Quincy, Illinois.



INSULATING MATERIALS—General Electric Co.. Schenectady, N. Y. (60-p. catalog) Covers entire line af insulating materials. Lists and describes

hundreds of items, including varnished cloths, varnishes, Glyptals, tapes, cords, cotton sleeving, varnished tubings, mica, wedges, soldering materials, cements, and compounds. Tab sheets separate catalog sections, each of which is devoted to different type of material. Separate



index for each section is printed on tabs. Plastic binding permits it to lie flat when opened.

\* \* \*

INSULATED CONDUIT SYSTEM — Ric-wil Co., Cleveland, Ohio. (4-pp., illustrated folder) Contains general description of entire line of company's products for insulation and protection of steam, hot water, oil, and process liquid distribution piping. Products described include insulated pipe units for single and multiple pipe systems, tile and cast iron conduits and accessories for all type systems.

\* \* \*

VIBRATORY MATERIAL HANDLING EQUIPMENT—Syntron Co.. Homer City, Pa. (64-pp., illustrated catalog) Gives latest information on complete line of company's products, including electric vibrators for bins, hoppers, and chutes, "Vibra-Flow" vibrating feeders, dry chemical feeder machines, "Weigh-Flow" gravimetric feeder machines, vibratory paper joggers, hydraulic vibrators, feeders and feeder machines, replacement shaft seals, concrete vibrators, electric hammers and self-contained portable gasoline hammer concrete breakers, and rock drills. Shows installations and applications of various equipment types.

\* \* \*

WHAT TO DO WHEN YOUR MEN, MATERIAL AND MACHINES HAVE GONE TO WAR—R. G. LeTourneau. Inc., Peoria, Ill. (12 pp., two color) Discusses military construction and industrial phases. Is generously illustrated with latest pictures of machinery at work under combat conditions. Describes best methods for pusher, straddle and downhill loading, side by side and "slot" dozing, V-ditch cutting, bank sloping, and loading of rooted material. Photos and charts present detailed "how-to" of each action. Emergency repairs for parts are thoroughly discussed and illustrated.

INDUSTRIAL PUMPS—Pomona Pump Co. Division. Joshua Hendy Iron Works, 206 E. Commercial St., Pomona, Calif. (64-pp., two-color catalog) Gives



complete story on each of Westco turbine type pumps and brief description of Pomona vertical pumps. Contents include general information, design detail, principle of operation, and operating characteristics. Basic pumping principle employed in Westco pumps produces multistage performance through use of single multi-vaned impeller, each vane imparting

additional pressure through regenerative action as it revolves within fixed liners.

# OUR PRODUCTION TODAY has an important meaning for tomorrow

★ Equipment we made before the declaration of war has proved to be valuable for the war effort. The standard NOVO line still continues to be produced—we were never required to change our set-up, our machinery, our manpower to any extent, or our distributor set-up. In other words, we went from peace-time production to that of war-time, making the same equipment for Uncle Sam. Our only change was to increase our effort, for more and more NOVO equipment continues to be needed.

In this regard NOVO distributors have been of tremendous assistance in getting NOVO equipment to new plants, air fields, training bases, ship yards, new roads, etc. They have also kept NOVO units operating.

Looking ahead we point out at this time that standard NOVO equipment will be in production and immediately available at the turn between the present emergency and post-war activities.

In the meantime, we suggest that you use the coupon and get full details on the NOVO line.

# NOVO

SEE A NOVO DISTRIBUTOR

ENGINE CO.

WE ARE IN PRODUCTION ON --

		Hoists Self-Priming
Diaphragm and Pressure Pump	Pavement Breakers	NOVO ENGINE CO.—214 Porter Street, Lansing, Mich.  Send information on Novo Diaphragm Pumps  Self-Priming Centrifugals   Pressure Pumps   Hoists   Light Plants   Pavement Breaker   Engines   Name   Address.
Engines	D=-000	CityState

### MACHINE FINISH CONCRETE TO STRETCH AVAILABLE MANPOWER

Give your present crews Whiteman **Dual Purpose Finishing Machines on** every concrete floating and finishing job the combination licks the manpower shortage by adding at least 40% to the per shift output of your men. For either floating or finishing the slab, ONE MAN with a Whiteman Machine covers 1,000 sq. ft. of floor in 15 minutes.

Even "green hands" get good results, the machine does the work, as the operator guides the rapidly rotating trowels over the floor.

Interchangeable trowels - "Heavi

Duti" for floating and "Finish" for finishing-make the one machine a dual purpose work expediter.

If you are short of men and want minimum costs wire for your nearest distributor's name.

> Manufacturers of Whiteman Concrete Equipment. Rodding and Finishing Machines - Adjustable Screed Stake Caps.



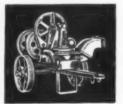
ONE MAN with a Whiteman Finishing Machine floats or finishes 1000 sq. ft. in 15 minutes.

## Whiteman MANUFACTURING CO.

3249 Casitas Avenue

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## <u>H.&E.</u> PUMPS



SINGLE and DOUBLE DIAPHRAGM PISTON FORCE · TRIPLEX ROAD PUMP · MULTI-STAGE JETTING SELF - PRIMING CENTRIFUGALS





\* The C. H. & E. pump line is complete with a full range of sizes for every application. Capacities are based on standard rating tables of the Contractors' Pump Manufacturers Bureau. C. H. & E., with more than thirty years' experience in the manufacture of construction equipment, has a pump for every job to give contractors efficient, low-cost, dependable pumping.

Send for Complete Catalog



MANUFACTURING COMPANY 3847 No. Palmer St., Milwaukee Wis.

BELT CONVEYORS-Continental Gin Co., Birmingham, Ala. (19 pp., illustrated) Gives engineering information, tables, and suggestions in design that will enable engineers to

select conveyors of proper size, speed, and power. Tables useful in selection of belt width cover lump size, peak capacity per hour, and characteristics of material and angle of repose. on horsepower indicate power to pull empty belt, to convey material horizontally, for each tripper, to lift material if conveyor is inclined, and to take care of losses in drive.



INSPECTION CAR-Buda Co., Harvey, Ill. (4-pp., two-color folder) Describes new F-2 Model B two to four man inspection car known as Roadmaster. Claims it embodies latest engineering refinements in safety and comfort together with long life construction and economical power. Is equipped with special spring mounted pedestal bearings and deep, well cushioned seats that absorb all road



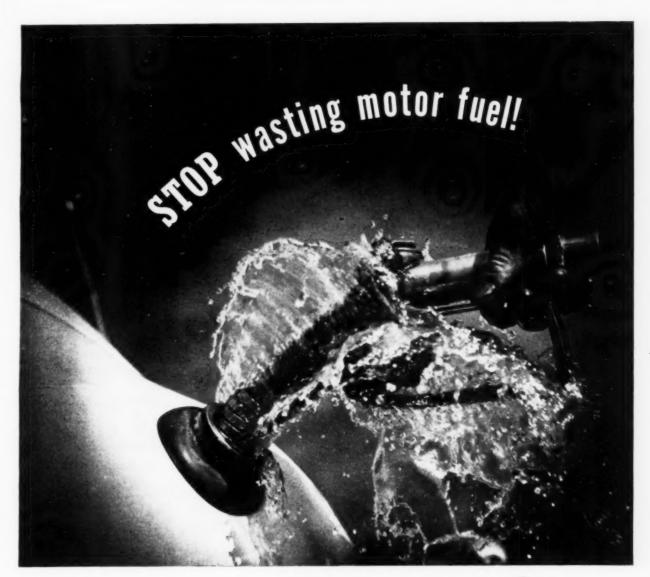
STUDIES IN ARC WELDING-James F. Lincoln Arc Welding Foundation, Cleveland, Ohio. (1,295 pp., illustrated) Includes 98 papers on arc welding submitted by trained technicians and engineers in foundation's 1940-42 Industrial Progress Award Program. Represents what is said to be most comprehensive and complete collection of design studies on arc welding published since founda-tion's first volume in 1939. Majority of 1,007 illustrations are actual photographs of welding pro-cedures. Each study includes designs, calculations, procedures, and other pertinent information show ing how advantages attributed to are welding are obtained. Contents are arranged in 9 sections with 98 chapters. Each chapter covers specific design subject and each section covers particular field, including automotive, aircraft, railroad, watercraft, structural, furniture and fixtures, commercial welding, containers, and machinery. Copies are available from foundation at \$1.50 in United States and \$2.00 elsewhere

INERT GAS GENERATORS — Roots-Connersville Blower Corp., Connersville, Ind. (8 pp., illustrated) Describes use of generators for eliminating ex-



plosion hazards in purging operations or wherever in flammable gases or liquids are processed, handled or stored. Generator produces cheaply mixture of nitrogen and carbon dioxide with a small percentage of water vapor and less than 1 percent of either oxygen or carbon monoxide as desired. Has large capacity, low operating and maintenance cost, burns gas or oil, and is sturdy in

construction and quiet in operation. Among its uses are in gas and coke oven industry, steel works, oil refineries, chemical and rubber plants, and on oil tankers. Booklet diagrammatically explains construction and operation and high-pres sure installation.



## RING-FREE Motor Oil saves fuel 2 ways

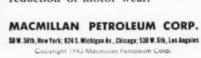
RING-FREE REMOVES CARBON. Carbon on pistons, rings, valves decreases motor efficiency—leads to loss of power—wastes fuel. Macmillan RING-FREE Motor Oil removes carbon while the

motor runs! That means better motor lubrication and substantial fuel savings.

RING-FREE REDUCES FRICTION.

The 2nd thing RING-FREE does to save fuel is reduce motor friction fast! That releases more power to the drive shaft and really cuts fuel waste. Here's proof: In 1094 certified road tests, with various makes of owner driven cars, the average saving of gasoline was 1.3 miles per gallon after crankcases had been drained and refilled with RING-FREE Motor Oil. In many types of *Diesel* operations, as much as 25% reductions in operating

costs (including fuel and maintenance) are reported. At the same time, oil consumption is reported decreased. Remember saving fuel is important—but beyond that, when it's better motor lubrication that saves fuel it also means a reduction of motor wear.





MACMILLAN

RING-FREE

MOTOR OIL





## HOW TO KEEP DIESEL ENGINES

With this sturdy, portable, light-weight Adeco Nozzle Tester, any mechanic can easily make quick, accurate tests on injector opening pressure, spray pattern, etc.; and detect stuck needle valves and leakage around valve seats. Adeco advantages have made this America's most widely used nozzle tester. Tests both large and small injectors, on bench or engine. Avoids costly delays and possible damage to engine. Keeps diesels operating at peak efficiency.

• Write for new illustrated bulletin.

AIRCRAFT & DIESEL EQUIPMENT CORP.
4401 N. RAVENSWOOD AVE. CHICAGO, ILLINOIS

AGITATORS IN ACTION—Eclipse Air Brush Co.. Inc., 400 Park Ave., Newark (7), N. J. (28 pp., illustrated) Shows Pneumix air motored agitators

in use on different types of work. Contains catalog and price list. Outstanding features of these compressed air agitators are elimination of fire and explosion hazards on mixing operations and variable speeds obtainable through air control. Booklet is companion piece to company's publication on spray equipment. Jobs pictured using agitators include textiles, petroleum, fluorescent lamps,



varnish, synthetic rubber, ink, riboflavin, aromatic oils, resin, strawberry ice cream, pantothenic acid, food, PT boats, biological products, milk, ointment, and airplane engines.

CHEMICAL FEEDERS—Chem-Feeds, Inc., 77 Reservoir Ave., Providence, R. I. (8 pp., two color) Describes Var-I-Feeder, portable, lightweight chemical solution feeder for emergency operations. Weighing only 57 lb., including test kit and other accessories, it is claimed to be most compact feeder on market for water main sterilization, military use or other emergency chlorination.

\* \* \*

CARE AND MAINTENANCE OF COMBAT TIRES—B. F. Goodrich Co., Akron, Ohio. (48 pp., illustrated) Section I of company's U. S. Army Training School Manual gives information on proper care, preventive maintenance and servicing of tires, tubes, endless and block tracks, and other rubber products for Army men operating motorized equipment. Second section on care and maintenance of endless rubber band tracks for half-track vehicles will be published shortly. Section I is divided into chapters on: (1) General; (2) Demounting Combat Tire from Divided Type Wheel; (3) Mounting Combat Tire on Divided Type Wheel; (4) Demounting Combat Tire from Wheel with Removable Rim Flange; (5) Mounting Combat Tire on Wheel with Removable Rim Flange; (6) Tools for Demounting and Mounting Tires; (7) Care and Maintenance of Tire on Vehicle; (8) Valve Repairs; (9) Tube Repairs; (10) Tire Repair; and (11) Data.

DIESELS FOR PROFITABLE POWER—Fairbanks.

Morse & Co., 600 S. Michigan Ave., Chicago (5),
Ill. (28 pp., two color) Includes brief history of com-



pany's background, together with particulars on design, manufacture and service facilities applicable to entire line of marine and stationary diesels. Includes loose leaf supplement sheet giving detailed operating cost data for typical Fairbanks, Morse municipal plants. Points out that simplicity of design makes it possible to incorporate new improvements into existing engines without disturbing basic parts. Fuel

consumption curves for various design modifications show improvement made by each change.



So long as the enemy resists ....

THE BYERS SHOVEL WE'D LIKE TO SHIP YOU IS HELP-ING BREAK DOWN THAT RESISTANCE FOR YOU.

In the meantime, owners of current and older models of Byers shovels and cranes may depend on Byers Parts Service to help them keep present equipment working steadily and satisfactorily.





and Differential Hoists

1-Beam Trolleys

Utility Maintenance Tools

Illinois

# PAVING THE WAY TO VICTORY



rypical installation of Blaw-Knox Batching Plants or aggregates and cement—representative of the plants in this railroad shipment.

# **BLAW-KNOX**

BLAW-KNOX DIVISION OF BLAW-KNOX COMPANY

Farmers Bank Bldg., Pittsburgh, Pa.

NEW YORK • CHICAGO • PHILADELPHIA

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CONCRET

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- . . is comprchensive, up-to-date and authoritative;
- answers your questions in any . . . blends theory, practice and fundamentals equally;
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## CIVIL ENGINEERING **HANDBOOK**

Editor-in-chief: Leonard C. Urquhart, Professor of Structural Engineering, Cornell University. Second Edition, 870 pages, 6 x 9, over 900 illustrations and diagrams

HERE are the fundamentals of the vari-ous subdivisions of civil engineering for men who actually plan, select, design, and construct civil engineering structures and projects. In each division a noteworthy specialist has contributed a compact treatise, developing fundamental theories as well as stating more involved ones, making the book not only a comprehensive reference work of modern civil engineering practice, but also adaptable for systematic study of any of the fields represented in it.

In this edition you will find surveying practice carefully defined; developments in highway and railroad work thoroughly covered; specialized data on design and construction of framed structures; new specifications for concrete and steel design to conform to approved specifications; important data on foundations, sewerage and water supply.



#### Here in one handy volume is the practical information you need on: -

- Land surveying Topographic mapping Hydrographic surveying Railway turnouts, connecting tracks and crossings and cressings
  -Widening, spiraling and banking
  of highway parements:
  -Hichway administration and finance;
  -Hichway succerning and toots;
  -Construction couts of reads and
  payments
  -Mechanics of Materials
  -Fluid greature

- Roof trusses Dead-lead stresses in bridge -Dead-lead strosce in bridge trusses
  -Lateral forces on bridge trusses
  -Arches
  -Slope-deflection
  -Moment distribution
  -Riveting and welding
  -Baring place and grillage beams
  -Bridge
  -Mill Buildings
  -Multi-stery buildings
  -Desion of sewerete mixtures
  -Mixer and mixing
  -Buildings and walls, feetings and foundations

- -Concrete arches -Bex culverts and rectangular -Preporties of soils
- -Mechanics of sail resistance -- Underpinning Sewerage and Sewage Disposal
- -Intokes and dams
  -Ground water
  -Aqueducts and pipe lines
- -Pumps and maters
  -Quality of water
- -Water purification

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McGraw-Hill Book Co., Inc., 330 W. 42nd Send me Urquhart—Civil Engineering for 10 days' examination on approval \$5.00, plus few cents postage, or return postage on orders accompanied by ren	g Handbook, 2nd Edition, In 10 days I will send n book postpaid. (We pay
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Position	***********
Company	

GLASS BLOCK-Owens-Illinois Glass Co., Toledo, Ohio. (24 pp., illustrated) Explains use of Insulux glass block panels for replacement of worn-out



windows. Step by-step photographs show how paneis are installed and how inserts can be built for ven-tilation and vision. Lists as glass block advantages that it saves fuel, saves steel and wood, saves electricity, reduces maintenance, prevents sabotage, improves conditions, eliminat lighting eliminates dust and dirt infiltration, is fireproof, and transmits less heat. Centeins details, diagrams,

and pictures showing how to replace various types sizes of window areas with glass block. includes short form specifications and technical

HEAT TRANSFER EQUIPMENT-Young Radiator Co., Racine, Wis. (8-pp., illustrated catalog) Summarizes type of services and products offered by Produced for use in military and commercial aircraft are oil temperature regulators, supercharger intercoolers, cabin heating coils, and engine jacket coolant radiators. Radiators for gas, gasoline and diesel engine power plants of generating sets, compressors, tanks, scout cars, trucks, and locomotives; lube oil coolers for all types of internal combustion engines and compressors; and intercoolers for compressors for air and other gases are also manufactured, as well as heat exchangers for marine and industrial service and products for industrial air conditioning.

MATERIAL FOR BRAKES—**S. K. Wellman Co.,** E. 51st St. at St. Clair, Cleveland, Ohio (4 pp., two color) Describes Velvetouch clutch facings and brake linings. Is all-metal friction material, combination of sintered powdered metals, compressed and welded to solid metal backing. Is not affected by oil or heat and can be supplied to exactly replace conventional materials.

(Continued from page 65)

NORFORK DAM

pleted to El. 460, 20 ft. below the level of Blocks 26 to 30.

On Block 25, adjacent to Block 26, the contractors constructed a concrete step 10 ft. high to carry the track on which the 12-yd. transfer hopper car moved to fill concrete buckets for either cableway. While being filled, the buckets rested on the concrete of Block 25, 10 ft. below the track. Dumptors advanced against a stoplog at the edge of Block 26 and discharged

(Continued on page 136)

# For Better Winter and Wet Weather OPERATION OF TOURNAPULLS...



EXTRA TRACTIVE POWER is built into Tournapulls by:

- 1. Centering weight on the drive wheels.
- 2. Use of extra-large diameter tires.

This extra tractive power enables Tournapulls to haul over soft, slippery spots that stick ordinary equipment. But, to take full advantage of this extra traction, keep your haul roads free from the slippage that's bound to result on icy, muddy surfaces.

INCREASE TIRE LIFE Slippage—whether from wetness, mud or ice—slows travel speed, usually reduces the load you can haul, wears off rubber and increases the danger of tire cuts. To lengthen tire life and get top speed and top yardage, give Tournapull drive wheels a slip-free surface that puts all your tractive power to work.

SAND ICY ROADS If your haul road is icy, pick up a Tournapull load of sand or cinders and spread it in a thin layer over the icy section.

AFTER QUICK SHOWERS When a quick shower wets the top inch or so of your haul road so it's "slick as glass", get some dry material out of the cut and spread it over the roadway. If the haul is too long to do this quickly or the wetness goes down 3 or 4 inches, scrape it off with a Tournapull, Dozer or motor grader.

MUCK OUT SOFT SPOTS When slippage occurs in soft spots, muck 'em out with a Tournapull or Dozer. After mucking out, fill in with dry dirt from the cut. Remember the size of your load is determined by what you can haul through and over slippery places. Make it big by cutting out slippage. You'll find it pays.

DEALER SERVICE PAYS, TOO Tournapulls are stoutly constructed to cut lost time to a minimum. The best of equipment, though, requires repair occasionally. Then you'll find quick, expert service available from 183 LeTourneau-"Caterpillar" dealers and branches in the U. S. Use it to keep your equipment operating at top efficiency NOW.

Tournapull with a load of material to spread over an icy, slippery spot.

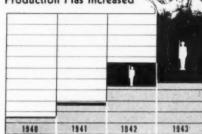
### FRANKLY, WE HAVEN'T BEEN HAPPY ABOUT OUR PARTS SITUATION . . .

You haven't been either we suspect (and that's putting it mildly). But now, the situation looks brighter for you. WPB tell us 25% of all LeTourneau parts production shall be distributed through LeTourneau-"Caterpillar" dealers for the repair of civilian equipment on essential projects.

#### 25% in '43 = Twice 1940

Maybe 25% sounds small, but we're now making 7 times more parts than in 1940. So—25% today means there's available to you and other civilian users twice the parts you got in 1940, a good parts year. Even so, dealers won't be permitted to carry complete parts stocks (parts for stock have gone to War) for over the counter sale.

How LeTourneau Parts Production Has Increased



Black area indicates sales to government; shaded area, sales for civilian use.

#### How You Can Help Us Help You

When your LeTourneau dealer can't supply the proper part from stock, he can get faster service for you from the factory if you supply him with machine serial number and WPB certification—he will gladly supply details and help.

Finally, most LeTourneau-"Caterpillar" dealers are equipped to renew such parts as axles, drum shafts, blades, forgings, etc. Take your problems to your dealer—make him Victory Construction headquarters for parts and repair service; make him your source of WPB information; ask his advice on how to get new or used equipment. See him NOW.

Tournapulls are designed to walk out of troublesome soft spots, but they more big ger loads faster over good winter haul roads like this. Good drainage pays profit



Peoria, Illinois - Stockton, California LeTourneau (Aust.) Pty Ltd., Rydalmere, New South Wales, Australia

# Your name is spelled "V"/



JAVANESE . . . that "V" in your name is a symbol of Victory . . . the Victory which we and our allies will help you win. We're working toward it now in mill and factory . . . and in mine and quarry. In mines where coal and ore and stone are blasted out of the earth. For such key men our own skilled workers are producing essential equipment — Ensign-Bickford Safety Fuse and Primacord-Bickford Detonating Fuse — to hasten mining production and promote safety.

Victory Begins Underground!

THE ENSIGN-BICKFORD COMPANY Simsbury, Connecticut

Primacord Bickford
Detonating Fuse



Resists Wear as Well as Breakage



The thicker center extends to the cutting edge where it retards wear-back.

Permits Deeper Hang, Better Balance Thicker socket

load is centered.

THE UNION FORK & HOE COMPANY 652 Hocking Street, Columbus 15, Ohio

RAZOR-BACK SHOVELS

Also Stone, Ballast, Industrial Forks, Asphalts and Road Rakes; Distributors Everywhere. (Continued from page 134)

their 4-yd. batches into the hopper car. Electric power for locomotion was supplied to the transfer car through a trailing cable which is dragged back and forth for a travel distance of about 60 ft. in a board-protected slot next to the concrete wall.

#### New Transfer Dock

Operation continued with the transfer car at the midpoint of the dam until May 10 of this year, when a flood in the North Fork River washed out the truck haul ramp to the top of Monolith 30. By that time, with two-thirds of the concrete placed in the dam, the transfer dock at the center of the cableway span had about served its purpose, and the hopper car was moved to the front of the mixing plant. At the new location, concrete is dumped directly from the mixers into the car, which fills cableway buckets in a dock similar to that used at the center of the dam. The car also services trucks hauling concrete for the power house and for final construction of the stilling basin,

#### Bonus System

Concrete crews on the three 8-hr. daily shifts are paid a bonus for concrete placed in excess of a bogey. The bogey ranges from 180 to 250 buckets per shift, depending upon the length of cableway haul. A double bonus is paid for buckets in excess of ten above bogey. During months of good average production, when concrete placed in the dam amounts to 75,000 yd. or more, the crews earn bonuses about 80 percent of the time. Except for operators of the Dumptors, all workmen connected with production or placement of concrete are eligible for the bonus. Dumptor operators are excluded because a bonus incentive might encourage reckless driving, contrary to the strict accident-prevention policies faithfully enforced on the job.

#### Direction

An accompanying chart gives the present organization in charge of the project for the contractors, The Utah Construction Co., Ogden, Utah, and Morrison-Knudsen Co., Inc., Boise, Idaho, joint sponsors, with participants including Henry J. Kaiser Co., The Kaiser Co., J. F. Shea Co., Inc., Pacific Bridge Co., McDonald & Kahn, Inc., General Construction Co., and W. A. Bechtel Co.

Since the start of the work, several engineers at various times have been in charge for the U. S. Engineers, Little

(Continued on page 138)



## High Dumping Clearance Speeds Operation to New Records—with the HEIL Bottom-Dump Trailer Wagon

By employing a construction principle long accepted in other construction equipment but never before used in a dump wagon, Heil engineers have made possible a totally new standard of performance for this type of equipment. The high clearance doors are POWER-OPENED in 2 seconds. The Heil cable power control unit is direct-connected to the tractor engine, and operates independently of the tractor transmission at any time when the engine is running. The dumping operation is under fingertip control. The load lets go all at once or spreads as with a cable scraper, at the will of the operator. This new Heil unit dumps and gets away in a flash. You need it to compete successfully in post-war earthmoving operations. Get the complete story now and be prepared. Post-war orders now being accepted. Write for bulletin.

> Left: Heil Cable Scraper Interchangeable on Same Power Unit Right: Heil Hydraulic Bulldozers

Turns at will off the windrew. No doors dragging in the dirt to slow up the unit and prevent sharp angle turning.

26" Clearance with Doors Closed

The familiar clamshell is opened by power, swings closed by gravity. That is exactly how this new Heil unit operates. When the dumping doors are pulled open by CABLE POWER, the doors swing up alongside the hopper — out of the way. The high clearance doors are interlocked, completely synchronized, fast and positive in operation. Patented construction.

Clamshell Principle





The HELL Company is engaged in all-out war production for Victory



THE HELL CO.

GENERAL OFFICES

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Tanks produce results only in actual combat on the firing line.

To conserve their fighting capacity they ride to battle on Rogers Trailers,

or if damaged are transported to the rear for repairs on a retriever type of trailer especially equipped to load disabled tanks.

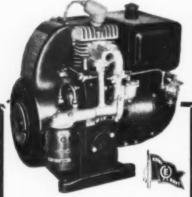
Meanwhile, thousands of standard Rogers Trailers are serving efficiently on our factory fronts or in transporting defense

equipment to various fortifications.

\*

CORP., ALBION, PENNA.





#### ELECTRICITY FOR ANY JOB ANYWHERE

★ ONAN GASOLINE DRIVEN ELECTRIC CENERATING FLANTS provide power and light for construction projects anywhere, for all applications where electricity is not otherwise available, and for emergency service. They're doing a war winning job on all fighting fronts.

Sizes from 350 to 35,000 watts, 50 to 800 cyrles, 110 to 660 volts, A.C. 6 to 4000 volts, D.C. Also dual A.C. and D.C. output models.

Your inquiry regarding present or past war needs will receive primot attention. D. W. ONAN &

ONAN



(Continued from page 136)

Rock District. Capt. John L. Kemple is resident engineer in charge of the project at present. Those who preceded him, since the beginning of construction, were R. M. Strohl, resident engineer; Major E. G. Herb, area engineer, and W. W. Ralphe, area engineer.

This is the first of several articles dealing with various phases of construction of Norfork Dam; others will appear in forthcoming issues.

## Army Construction In Middle East

(Continued from page 58)

at a price of \$10 a head, purchased three wives for the laggard Arab foreman. Progress was immediately stepped up beyond the fondest expectations of the con-

tractor's superintendent.

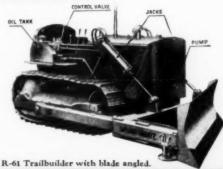
To obtain fresh water, sailing boats, camels, food and native labor, the same superintendent encountered a shrewd trader in the person of an Arab chieftain who recognized no pay-off except the Maria Theresa dollar, a silver coin of ancient Austrian vintage and extremely heavy weight originally circulated in Abyssinia. To obtain these coins, for which no other substitute form of currency was acceptable to the Arab potentate, it was necessary to fly a plane 1,800 miles every month to obtain the necessary silver coins for paying the bills owed by the contractor, amounting to about \$20,-000 every thirty days. The delivery of the silver coins, however, did not conclude the transaction. The crafty Arab chieftain insisted on testing each individual coin before its acceptance. After mounting an improvised throne, he ordered a stone slab placed in front of him and two large wicker baskets set on the ground, one at his right and the other at his left. One by one he dropped each coin on the stone slab; if its "ring" sounded to him authentic, it was tossed into the basket at his right, but if the clink of the metal failed to satisfy his exacting tone sense that coin was flung into the "reject" basket at his left and had to be replaced.

For this project a picked crew of hardy, resourceful craftsmen and a couple of civilian medical aides were chosen and provided with food supplies sufficient for the estimated duration of the job. In addition, the equipment included portable refrigerators and generators, distilling

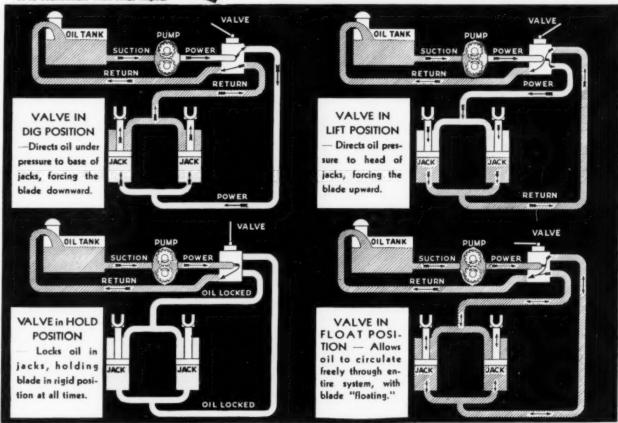
(Continued on page 140)

TRAINING LESSON No. 3.

## HOW LAPLANT-CHOATE HYDRAULIC CONTROL INCREASES 'DOZER EFFICIENCY



Especially where digging is tough, LaPlant-Choate 'dozers with hydraulic control usually average at least 20% more yardage than any cable outfit. Chief reason is extra "down-pressure" (up to more than 2 tons at the cutting edge, depending on model) plus the ability to hold your blade in a rigid position under power. Smooth, effortless and self-lubricating, LaPlant-Choate hydraulic control is extremely simple. All this control involves is a tank for oil\* . . . a pump to generate pressure . . . a valve to direct the pressure . . . and two doubleacting jacks to apply it to the 'dozer blade. See diagrams below. (Oil under pressure is shown in yellow).



<sup>6</sup> Always keep oil tank filled to proper level with highgrademotor oil (winter: SAE 10-20; summer: SAE 30-40). Drain, flush and re-fill with new oil every \$12 hours.

SEE YOUR LaPlant-Choate-"Caterpillar"

DISTRIBUTOR

FOR GENUINE PARTS AND EXPERIENCED SERVICE

# MANUFACTURING CO.Inc. CEDAR RAPIDS, IOWA, U.S.A.-CABLE: "LAPCHOATE"

WORLD-FAMOUS TOOLS FOR EARTH-MOVING, LAND-CLEARING AND SNOW REMOVAL. BULLDOZERS, TRAILBUILDERS, "CARRIMOR" SCRAPERS, RIPPERS, TING ROLLERS, TREEDOZERS, BRUSH AND ROOT CUTTERS, BRUSH RAKES, STIMERS, STUMP SPLITTERS, ETC. (HYDRAULIC OR CABLE CONTROLLED)



CARVER CERTIFIED CENTRIFUGALS will show you something new in profitable pump performance on your job, too. Carver's are the sturdy, fast-priming units that handle mud, sand or grit without a murmur; the pumps with the Lifetime Seal that keeps water in and air out for good!

If there's a pumping operation involved in your job, you'll be hours and dollars ahead to see your nearby Carver distributor now. Or write us today for the big new Carver Catalog.



(Continued from page 138)
outfits to render salt water drinkable,
light construction machinery and light
trucks. Because of the inaccessibility of
the job sites an Army Air Transport
plane was obtained to service them.

#### Anglo-Egyptian Sudan Jobs

Because of the difficulty of transport to desert airport sites by truck and camel, designs of all structures had to be simplified and improvised to save weight and make use of such materials as could be delivered or obtained from local sources. Labor crews were recruited from Bedouins and tall, husky Sudanese. These jobs were located in Africa's lion and leopard country and when they were finished the contractor's men enjoyed some excellent big game hunting.

#### Palestine Repair Depot

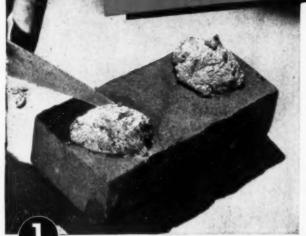
One of the last projects to be undertaken was a repair depot similar to, but smaller than, one of the largest undertakings performed by the company. The setup was for approximately 6,000 men and included shops, living quarters and a 450-bed hospital. On this work engineering personnel was plentiful because of the great influx of refugees with professional training, but differences in methods and language complicated operations. Then, too, the different religious holidays prevailing in the country presented a problem in administration. The Arab holiday is Friday, the Hebrew is Saturday and the Christian is Sunday. Since the preponderance of the office workers, local supervisory help and skilled labor were Jews, it was decided, with the area engineer's approval, that the most efficient course would be to accept the holiday prevailing, namely Saturday.

Based upon the experience of the British, construction using a minimum of wood and reinforcing steel was investigated. In the hospital wards, for example, the wood casement windows were hung directly on concrete jambs which were formed when the wall was poured. In roof construction the narrow span buildings were roofed with vaulted corrugated iron, bent to a radius, lapped and nailed on battens, using practically no wood. In larger buildings such as mess halls, a modification of the British "Stonehenge" Type was used. On 20-ft. bays the corrugated iron roofing is supported by trussed purlins 20 ft. long.

It was possible to obtain locally a certain amount of construction materials which were under the control of the British authorities and were released by them to the contractor. It was also possible to sublet certain features of the work. For example, a sub-contract was let for the

(Continued on page 142)





Slap a small amount of Brixment mortar, and an equal amount of 50-50 lime and cement mortar, on a brick. Wait a minute, then feel each mortar.



Test each mortar. You will find that the Brixment mortar stays plastic far longer than the other mortar. This proves greater water-retaining capacity.

# BRIXMENT Mortar Has Far Greater Water-Retention!

WATER-RETAINING CAPACITY is the ability of a mortar to retain its moisture, and hence its plasticity, when spread out on porous brick.

High water-retaining capacity is of extreme importance in mortar. If the mortar does not have high water-retaining capacity, it is too quickly sucked dry by the brick; the mortar stiffens too soon, the brick cannot be properly bedded, and a good bond cannot be obtained.

Brixment mortar has extremely high water-retaining capacity. It strongly resists the sucking action of the brick. Brixment mortar therefore stays smooth and plastic when spread out on the wall. This permits a more thorough bedding of the brick, and a more complete contact between the brick and the mortar. The result is a better bond, and hence a stronger and more water-tight wall.



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CONSTRUCTION RATCHETS

The ARMSTRONG Reversible Ratchet Construction Wrenches are made of steel thruout—the Ratchets are drop forged, the Nut Socket machined from special analysis bar steel. All parts except the handle are hardened. The spindle of the Ratchet is of "wide open" design—permits bolt to pass thru the Ratchet so that nuts can be run any distance along bolt and securely set with one setting. 24" or 36" Ratchets take square or hexagonal sockets for nuts of from 1" to 2% did i.o. or 1%" to 3%" dia., respectively.

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A QUICK AND ECONOMICAL REPAIR

ALLIED STEEL PRODUCTS, INC.

N.B.C. BLDG.

CLEVELAND 14, OHIO

(Continued from page 140)

manufacture of concrete blocks at the site and a sub-contract was let for the manufacture and installation of reinforced concrete fence posts. Metal windows were made of railroad-rail procured from nearby orange groves. Every effort was made to conserve shipping space by making use of local materials.

One type of construction commonly



TINY BURROS are used for delivery of crushed stone to project.

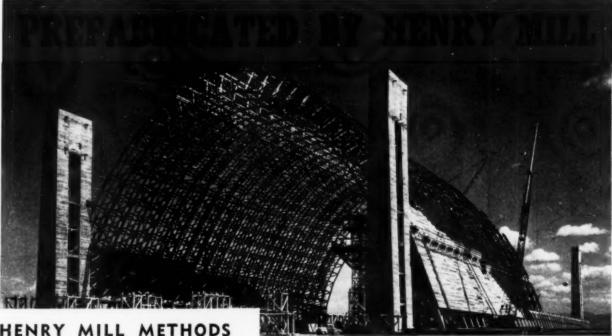
used locally is to precast wall slabs in a horizontal position and then raise them to the vertical, and when set, to key them into reinforced buttressed wall columns.

The lack of sufficient American supervisory personnel was felt in directing the work. Native foremen, such as carpenter and mason foremen, were used as much as possible, but they were difficult to find. Skilled native labor such as mechanics, plumbers, and electricians were available in moderate numbers-this supply was augmented by importation from the United States. Local Arab laborers were plentiful but of very poor quality and were trained to do task work. Work for these laborers to be done in one day had to be very carefully laid out the previous day. String lines and stakes meant nothing to the Arab laborers. The digging work had to be actually marked on the ground with a pick, to indicate to the laborer his daily task.

#### Commendation from Army

After the British 8th Army succeeded in driving the Axis forces out of Egypt and Libya, the Johnson, Drake & Piper organization, which had spent about a year and a half in various parts of Africa, Palestine and Arabia, completed its construction mission and headed back for the United States by ship and plane. That its work was well done, in the face of almost insurmountable difficulties and hardships, is attested by the following

(Continued on page 144)





DESIGN ENGINEERING-SPECIALIZED, RESOURCE-FUL-A staff of design engineers, thoroughly ex-



2 MACHINE PRODUCTION - "Assembly line" methods with specialized equipment en-Henry Mill to prefabricate heavy timber faster, cheaper, and with greater precision ssible with hand-framing methods.



FOLLOW-THROUGH - Henry Mill accepts full responsibility for maintenance of production and shipping schedules - and for assembly and erection in the field where required. Henry Mill follows a standard procedure of periodic inspections and submits maintenance recommendations.

## Henry Mill & Timber Company prefabricated structural framework for 5 of these gigantic blimp hangars for the Navy. More than 10 million FBM of lumber was involved, and fabrication was completed in 8 months.

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Modern timber engineering and machine fabrication has changed wood from a hand-framed material to a more adaptable construction element capable of bringing new speed and economy to many types of projects. HENRY MILL is an acknowledged leader in timber engineering-and in bringing modern machine methods to the prefabrication of heavy timber structures. This organization is at the service of owners, architects, engineers and contractors.

WRITE For "Prefabrication," a 90-page book now on the press, illustrating in detail Henry Mill methods and engineering detail of many projects completed.



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## Sonotube





MATERIALS Approved Concrete Pier Forms

A heavy laminated fibre tube in lengths up to 24 feet - ready to cut (hand saw), to size (pier height), on the job requires only minimum bracing available for

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8"	9"	10"	11%"	12"	13%"
		SQUARE	INCHE	S	
50.26	64	78.54	100	113.1	144

Sonotube is widely accepted today as standard for use in many types of construction, on both government and private jobs. Practical up to 10 feet in height and 144 sq. in. bearing surface. Forms can be strippedoff or allowed to slough off.

Widely used and (U.S. Army Engineers Approved for U.S. Navy Department Cantonments and Yards and Docks Construction P. B. A. and F. H. A.

WRITE FOR DELIVERED PRICES SONOCO PRODUCTS COMPANY (Continued from page 142)

excerpt from a report by Major General R. W. Crawford, commanding the S. O. S. of the U.S. Army Forces in the Middle East, to the Commanding General (Brehon B. Somervell), Services of Supply, Washington, D. C .:

"Johnson, Drake & Piper, Inc., has constructed a large number of Army construction projects in the Middle East under the most difficult conditions. Ingenuity, perseverance and cooperation have been the keynote to the accomplishments of this firm in this theatre.

The contract operations in the Middle East for the Corps of Engineers were administered through the North Atlantic Division Office, in New York City, and the North African District Engineer Office, in Cairo. In an official communication on the part played in the Middle East by the Johnson, Drake & Piper organization, addressed to the Chief of Engineers, Washington, D. C., Brig. Gen. B. C. Dunn, Division Engineer, makes specific reference to "the contractor's outstanding ability to perform his responsibility under extremely adverse conditions, his fine spirit of cooperation, excellent engineering foresight and efficiency in carrying through to completion difficult and diversified construction projects."



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All Photos Courtesy T. V. A.

T.V.A. Engineers were faced with a particularly difficult aggregate handling job in constructing Fontana Dam. They solved that problem by an ingenious conveying system using 37 belt conveyors. Equipped with Barber-Greene troughing idlers and

TOP: View of aggregate processing plants. BOTTOM: Dam under construction showing B-G Conveyors bringing raw aggregate to batch plant and conveying mix to the forms.

terminal machinery totalling approximately two miles of conveying equipment, the system crosses the river twice and processes the aggregate as it travels from the quarry to the dam. Shown on these two pages are some of the conveyors used in the setup as the T.V.A. Engineers worked it out.

## **BARBER-GREENE**

AURORA, ILLINOIS, U. S. A.





## Water for Britain's Desert Army

(Continued from page 69)

Vastly increased demands for water were inevitable, and the General Officer Commanding Western Desert Force asked that a water pipeline should be constructed from El Daba to Sidi Barrani.

On Sept. 6 orders were issued by General Headquarters for the pipelines to be laid from El Daba to a point 30 mi. west of Matruh, some 45 mi. short of Sidi Barrani.

At this date a large filtration plant, capable of supplying 5,000 tons of water daily, was under construction at a point about 15 mi. south of Alexandria, and the new supply, together with that already available from Alexandria, itself, was calculated to be sufficient for forward needs. Extensive and complicated work in duplicating the existing Alexandria-El Daba pipeline was put in hand.

It was also decided that seven pumping stations and reservoirs should be constructed between El Daba and the proposed new pipe head. At the same time, to guard against any danger of shortage, an undeveloped source of water was opened at Fuka between El Daba and Matruh, to supplement the flow from Alexandria.

#### Pipeline Extended 30 Mi. West

All this work was scheduled for completion by Oct. 30, 1941. On Sept. 25, however, when everything was well under way, additional piping arrived in Egypt and it was decided to extend the proposed pipeline a further 30 mi. to the west, to the top of the escarpment.

The work still had to be finished by the end of October, so the Royal Engineers were faced with the task of laying within two months 145 mi. of mixed pipe, with seven new pumping stations and ten large reservoirs.

As preparations for the attack were in full swing, every train was fully loaded with combat stores and equipment, and it was only with extreme difficulty that the pipes and water stores could be transported. Labor was in such great demand that engineer parties were unable to obtain much of the unskilled labor they needed. The result of this was that all available engineer and pioneer troops had to be put on the work at very short notice. In all, some 2,000 sappers, and about as many Palestinian and native pioneer troops were employed.

From El Daba to the originally proposed pipe head, the line was laid close to the coast road and railroad. This was easy going, but for the last 30 mi. the pipe had to be carried across soft sand, which entailed extremely laborious work. Special tracks had to be cut in the desert for the truck convoys. The traffic was heavy and the desert so soft that it was necessary to cut a new track every day the pipe-carrying convoys were at work, which resulted in about 25 parallel tracks being cut.

The pipe reservoirs and pumping stations were completed on time. The next task was to fill the pipeline, for that had to be done to start delivery. Three thousand tons of water was needed for the western sector alone. This was brought by sea to Matruh, while the eastern section of the pipe was filled simultaneously by pumping from Alexandria.

The filling process took four weeks, during which period sapper parties were continuously working on blockages, leaks and air locks. On Oct. 15, 1941, exactly according to the program mapped out by the engineers, the new source at Fuka began to deliver supplies of water. This was used to supplement the supplies being landed at Matruh.

#### Pipelines Are Camouflaged

While filling was going on, other engineer and pioneer troops were busy camouflaging the new pipelines. All obvious excavations were filled in and reservoirs were concealed. Dummy pipelines, reservoirs and pumping stations were constructed with such success that enemy bombing attacks were drawn to the dummies, while the real objects were left untouched.

On Oct. 30 the pipeline was complete and a large water point was opened on the escarpment 30 mi. south east of Sidi Barrani. The advantage of the pipeline was felt immediately, as one water convoy was now able to supply forward troops where six had been required under previous conditions. The supply of water at this point and further back was found to be so abundant that the needs of all troops, vehicles and locomotives were met without difficulty.

The construction of this water pipeline was a magnificent achievement. About 145 mi. of pipe, together with materials for 7 pumping stations and 10 large reservoirs, were brought from dumps in the Nile Delta and laid down in the desert ready to deliver water. And this was done, counting from the moment orders were issued in Cairo, in 56 days. This great feat was accomplished under most difficult working conditions.

Tasks of like nature are being carried out by Britain's Royal Engineer units all over the world. Sometimes they are recognized, sometimes they pass unnoticed, but however hard the job may be, to the sapper it is just part of the day's work.



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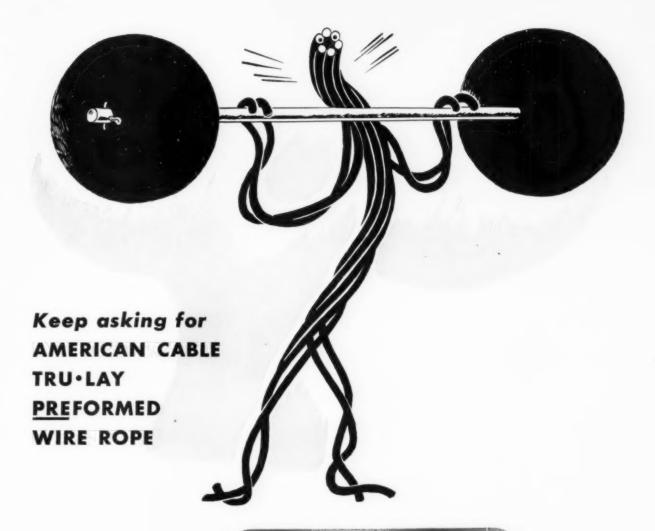
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